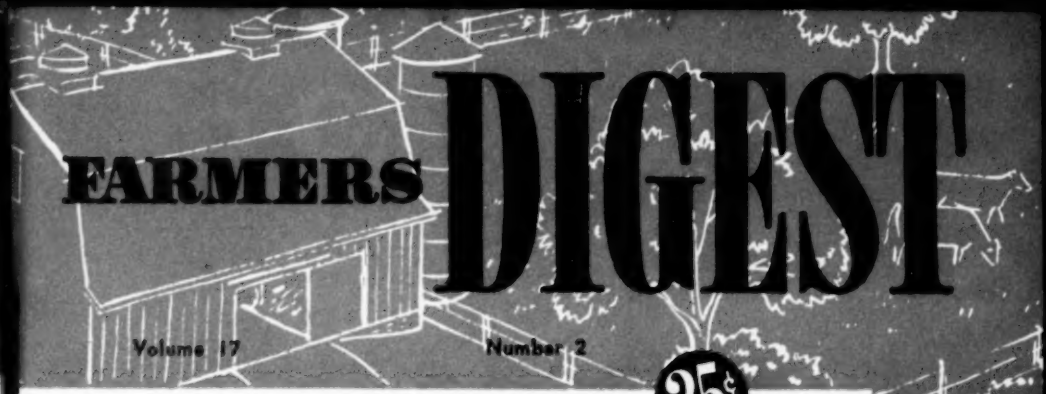

FARMERS DIGEST

Volume 17 Number 2

25¢

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The Farmer's Digest

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THE NEWEST BOOKS ON PASTURES AND FORAGE CROPS

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Pasture Production and Management—By R. H. Lush, M.S., Professor of Dairying: Dairy Husbandman. Published 1952. Blakiston. Tells how to intensively cultivate, irrigate and manage pastures, so that the producers of any sort of livestock, from chickens to beef cattle, can secure intensive feeding of a large number of animals on a small pasture area $3.75

Forage Crops— By Gilbert H. Ahlgren, Rutgers University. 418 pages, 6x9, 99 illustrations. Published December, 1949. McGraw-Hill. A fine text, considering all phases of forage crop production. The book covers the important hay and silage crops, their culture and management, adaptation, their use in mixtures and seed production $5.50

Forages—Hughes, Metcalfe and Heath. 700 pages, 234 illustrations. Clothbound. Iowa State college. Published 1952. 55 of the foremost authorities in their respective fields contribute to the 60 chapters covering all phases of forage production. For each crop, gives detailed information on varieties, utilization and management problems....$6.75

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The Farmers Digest
Volume 17 June-July 1953 Number 2

Early-Cut Hay Beats Late-Cut in Feed Value

Condensed from The Kentucky Farmer

TIME of cutting is one of the most important factors in the production of high quality hay of any kind. Early-cut hay has greater feed value than late-cut. The stage of growth at which it has the greatest feed value varies somewhat with the species and variety.

Timothy should be cut from early bloom to nearly full bloom stage. If cut not later than early bloom and properly cured, timothy hay compares favorably in protein content and feed value with all other hay grasses.

Morrison says of timothy: "When early cutting is combined with nitrogenous fertilization, the hay often contains twice as much protein as late-cut hay from land deficient in nitrogen," and that such hay "can successfully be substituted for legume hay in feeding dairy cows during the usual winter feeding periods."

Clover and timothy-clover mixed should be cut when the clover is in half to nearly full bloom stage. Mixture of grasses with or without timothy should be cut not later than when any of the major component grasses are in full bloom, and preferably before full bloom.

Alfalfa should be cut for hay when in one-tenth to one-fourth bloom, or when the basal shoots have made considerable growth or the foliage takes on a yellowish

Reprinted by permission from The Kentucky Farmer
Louisville, Kentucky

cast. Hay yields may be larger and stands maintained longer when cutting is delayed until the plants are in full bloom, but the increased yields are not likely to compensate for the loss in feeding value of late-cut hay.

Early fall cutting of alfalfa in cold climates, so as to permit the storage of adequate food reserves before freezing weather sets in, is necessary for winter survival and for best forage and seed production the following year.

Green color is an important physical characteristic of all hays. It is associated with carotene and vitamin A, and its loss through too late cutting or weather damage means loss of valuable protein and minerals. The essential characteristics of all high quality hays are soundness, freedom from foreign material, green color, pliable stems, and with legumes in particular a high percentage of leaves and clinging foliage.

In making high quality hay the most rapid removal of water by quick curing should be done so as to retain leaves, preserve green color, and produce the best dried product in appearance, feed value and composition. Where weather conditions at haying time are usually unfavorable or uncertain for the drying of hay, artificial drying should be considered. This increases the cost of hay, but the greater value of the product usually compensates for the extra cost.

Regardless of other factors, high quality hay having the greatest feed value can be produced only on fertile soils containing those elements necessary for both plant growth and animal feed and on meadows kept clean of weeds and other trash.

Digestible Nutrients in Hay at Different Stages of Growth*

	Digestible protein %	Total-digestible nutrients %
Alfalfa Hay (90.5% dry)		
.1 to .5 bloom....	11.2	51.7
.75 to full bloom .	10.3	50.1
Past bloom	9.2	47.6
Timothy Hay (89% dry)		
Before bloom ...	5.4	56.8
Early bloom	4.1	50.8
Full bloom	3.3	48.1
Late bloom	2.6	44.2
Late seed	2.1	42.2
Red Clover Hay (88.1% dry)		
Before bloom ...	11.3	60.1
In bloom	7.8	54.3
Stemmy	5.7	49.1

* Analyses from Morrison's "Feeds and Feeding," 21st edition.

Bees were busier than ever last year. United States honey output per colony was 49.5 pounds, the most reported in 11 years. Although there were one per cent fewer bee colonies last year than in 1951, total honey production was six per cent higher. It was estimated at 273 million pounds for 1952.

A New Pasture Every Day

Temporary fences divide pastures into strips, boost yields 20 to 30 per cent. Here's how it's done . . .

Condensed from Farm Journal

Bob Fowler

IT'S SO new that only a handful of dairymen are "daily rationing" their pastures. Those who do, like it.

You may want to try the system too, when you hear what it does for dairymen like John Busch of Santa Clara County, California, and Chester Noyes of Coos County, New Hampshire. They report: 20 to 30 per cent more feed off the same land; cows are eager to graze fresh pasture, thus eat more, produce more; fewer ups and downs in the milk checks.

One dairyman has 42 separate plots for his herd of 53 milkers. Another turns his cows on a new pasture every night, as well as one each morning.

California dairymen are getting some of the most spectacular results from the new system with their irrigated pastures.

"It's the only way to handle grass," says John Busch, a Santa Clara County renter who milks Holsteins. Today he's getting one-third more feed as compared with his old, fixed acreage pastures.

Busch has his 75 acres of pasture divided into 17 permanent plots with smooth-wire electric fence. He makes his plots long and narrow — no more than 125 feet across at the widest—to make the daily plot changing easy.

He subdivides those long strips into one day pastures, using a single strand of light gauge, "hot" wire. Three old broom stick handles fitted with insulators are his posts.

Busch estimates with his eye what the cows will clean up in one day, and varies the plot size to fit the growing season. During the lush seasons of April or May his plots get down in size to about an acre per day for his 60 cows.

Reprinted by permission from Farm Journal
Philadelphia, Pennsylvania

In the slack pasture seasons of September, he expands them to two acres or more.

"The cows stay on a more even keel," Busch says. *"I haven't had a case of bloat in two years."*

"Accordion pastures" is the way Arthur Ainscough of Santa Barbara County describes them. Ainscough, who milks 115 Holsteins, turned to daily ration grazing for the first time last year.

Before that, his 100 acres of pasture were divided into 16 permanent fields—all about as wide as they were long. That meant long, temporary wire spans, unless he went to the trouble of moving posts.

Instead, he decided to add more posts and wire, and divide each field down the center. Then all it would take to get one day pastures would be a short span of electric fence.

"We've never been able to cut 30 acres for hay before," Ainscough says. "We've had more pasture this year, too."

But isn't it a lot of work to move fences daily?

Takes only about 15 to 20 minutes a day, most Californians report, and some don't spend that long. Forage gains alone more than repay this.

One of the slickest quick change fence post setups is that of Eldon and Lloyd Davidson of Santa Barbara County.

They asked their neighborhood blacksmith to make 42 inch posts from seven-sixteenths inch steel rods (smaller rods bend, they found). One end is sharpened, and a step is welded 12 inches back from the point. On the other end, a side opening insulator or piece of rubber tubing is attached to hold the wire.

So instead of lugging around heavy posts and sledges, the Davidsons tote an armful of their rod posts; set them easily with a foot the same way you stand a shovel upright in the soil.

Another gimmick that speeds fence moving is a wire reel. One California dairyman uses an old garden hose reel, while another uses aluminum wire on a reel from a deep sea fishing outfit.

To tighten his movable fence wire, Paul Pryor of Kern County uses his barbed wire stretcher. If you use steel posts, you can set them against the slack to tighten it.

More time between grazings for re-growth is one reason why daily ration grazing boosts forage yields. Some tests made by Dr. M. L. Peterson, agronomy department head at the University of California, point up this fact.

Dr. Peterson used three common irrigated legumes — alfalfa, ladino clover and birdsfoot trefoil —in these trials. Each was seeded with a mixture of grasses, including ryegrass, orchard grass and alta fescue.

But since forage feed value slips as it ages in the field, the ideal re-growth period will be less than five weeks.

Vic Osterli, California extension forage crops specialist, tells dairymen this:

"Your main pasture legume determines how long you can let your pasture grow, and still get the best feed value. We recommend 24 to 25 days for ladino clover; 28 to 30 days for alfalfa; and 25 to 30 days for birdsfoot trefoil.

"If you see that you won't make the pasture rotation circuit that quickly, make silage or hay from what's extra.

"You'll also find that fewer weeds appear in your grasses and legumes when they have these recovery periods."

Here's how bloat control works out under the daily rationing system.

Several California dairymen say that they avoid turning their cows on new pasture while it is still wet with dew. Some make their pasture changes in the afternoon rather than morning.

Arthur Ainscough turns his cows out an hour or so each morning, on yesterday's well eaten plot, before moving the wire ahead over new growth. Before, when he turned his cows out on larger pastures for several days, that first day was critical for bloat.

"We had to watch the cows closely," he recalls, "and they wasted a lot of feed by trampling. By the third day they were ready to move, whether they had eaten all the forage or not. That's why our milk flow had ups and down."

New England farmers with their small fields have been moving toward daily ration grazing. For years they've been rotating pastures every few days, and now an increasing number are rotating every day.

In fact, Chester Noyes of Coos County, New Hampshire, goes the system one better by *nightly rationing* — turning his cows on a new pasture near the barn at night, as well as putting them on a fresh one each morning.

Noyes switched over to daily rationing last year when he broke up an eight acre field of ladino clover into four lanes. After his 24 milkers have daily grazed a complete lane, he follows with his young stock.

We can't start daily rationing much before July in this part of the country," says Noyes. "When the pastures first come on in June, we put the cows on 'em full blast."

A crop of hay or grass silage comes off next, and the field is top-dressed. Then when the regrowth is big enough, he fences and starts daily rationing.

"The extra work of fencing isn't

worth mentioning, compared to the 20 to 30 per cent more feed which I get off the same ground," he says. "Fencing takes me less than two hours per week."

Robert Foote of Tolland County, Connecticut, has 42 separate pasture plots for his 53 Holstein milkers.

Walter Hurlburt of Berkshire County, Massachusetts, gives his cows a new pasture every day—says that it boosts his feed supply by about 20 per cent, and eliminates the bloat problem.

In the south, daily rationing is also on the way. Dr. Roy Blaser of the Virginia Experiment Station says that many dairymen in that area already switch pastures every two or three days.

So the system is finding converts all across the country.

Sulfur Dioxide Preservative for High-Moisture Silage

Sulfur dioxide is a good preservative for silage made from high moisture forages.

R. G. Connelly, Virginia dairy husbandman, says these high moisture forages include alfalfa, ladino clover, orchard grass, early pasturage, and hay crops.

Studies indicate that sulfur dioxide used at the rate of five pounds per ton of silage reduces plant cell respiration and fermentation in the silage; but it doesn't prevent molding in poorly packed or over-wilted silage, or on exposed surfaces of silage in trenches or stacks.

Sulfur dioxide is a liquid under pressure, which may be released as a gas, by means of a special injection device. To assure preservation, it must be distributed evenly in proper amounts by carefully timed injections as the silo is filled. The injections are made at less than two foot intervals on the surface of the silage and to a depth of two to four feet. If more than five pounds of sulfur dioxide are used, or if it is not evenly distributed, the silage may be unpalatable.

The sulfur dioxide decreases fermentation losses in the silage. Less lactic acid, volatile acid and ammonia are produced. The loss of protein, sugar, carotene and dry matter is minimized.

Cows fed silage preserved with sulfur dioxide showed no ill effects. In fact, the milk from these cows showed higher carotene content. Sulfur dioxide may prove especially valuable in preserving early spring and summer forage crops as silage.

Virginia Polytechnic Institute

Good Breeding Stock Pays

"You have to milk ordinary cows for awhile before you really appreciate good ones," says Dale McHenry

Condensed from Kansas Farmer

DALE McHENRY, young Kansas dairyman, gets enthusiastic when talking about his herd of purebred Holsteins.

"I started milking grade cows in 1936," says Mr. McHenry, but it wasn't until 1948 I started testing. That first year my herd average was 275 pounds of butterfat, which is well above the national average, but it just wasn't good enough.

"When 1949 rolled around," he continues, "I headed for Wisconsin and bought 18 head of heifers, some bred and some calves." Looking back on this purchase he believes he made at least a partial mistake. "I wouldn't buy more young calves," he says, "because it takes too long to start getting your money back."

But of one thing he is certain. "I did buy the very best quality I could afford. Every heifer came from a herd with at least 400 pound butterfat records."

The wisdom of his choice has been proved on the farm. From 275 pounds of butterfat in 1949, Mr. McHenry jumped his herd average to 431 pounds in 1951, and also won third place in the state contest on herd improvement.

Although he likes every cow on the place, he is especially fond of the five year old queen of his herd. She produced 584 pounds of butterfat and 16,920 pounds of milk in 337 days on twice daily milking in 1951.

"I thought I was putting out a lot of money when I paid $650 for Katie as a bred heifer," he recalls. "But, already she has added two heifer calves to the herd. In 1951 she cleared $432.89 above feed cost in 305 days, and this year in 274 days she has cleared $431.52. That's a pretty good return on my investment."

Quality butterfat cows in the herd have proved profitable right down the line, too. The McHenry herd during 1951, with 19 head milking, averaged $239 profit per head above feed cost.

Reprinted by permission from Kansas Farmer
Topeka, Kansas

"This was done," says Mr. McHenry, "despite the fact I bought all the grain and some hay."

Producing feed for his herd has been a major problem. "I bought this farm in 1945," he says, "and it had been farmed on a continuous grain plan for so long it was worn out."

To build up his farm Mr. McHenry has been seeding legumes and grasses and using fertilizer to give them the proper boost. On alfalfa he uses 100 pounds of 45 per cent superphosphate an acre. On a mixture of bluegrass and white clover he fertilizes with 100 pounds of 4-16-0. "I probably should use 200 pounds instead of 100 to get maximum results," he says. All of his grass and legume land has been manured heavily. As a result of his work to improve his grass his pastures now will carry three times as much stock as when he started. Weeds are controlled by three and sometimes four mowings a year.

Mr. McHenry had 25 acres of Sudan last year that proved a lifesaver and sowed 25 acres of alfalfa last fall for hay. He also has 15 acres of brome with voluntary red clover in it. The brome in this mixture was treated with 100 pounds of 45 per cent superphosphate.

Last year was the first he had any corn but he planted 35 acres. Twenty acres went into the silo along with a 15 acre patch of hegari.

Next to quality of cattle, Mr. McHenry considers feeding the most important part of his program. Heifer calves are started on the bucket, getting milk at the rate of 10 per cent of their body weight. Calf meal is added as soon as possible and calves are gradually worked off milk and onto meal. Corn and oats are added as soon as possible and a mixture of alfalfa - brome hay is fed as soon as calves are old enough to handle it. "I like to get heifers up to a weight of at least 1,000 pounds by the time they have their first calf," says Mr. McHenry. He has had a few heifers weighing above 1,300 pounds at first calf time.

* * *

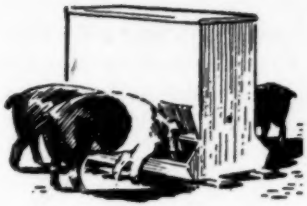
The reason a dollar won't do as much for people as it once did—is people won't do as much for a dollar as they once did.

* * *

Milk cows get 35 to 40 pounds of silage daily, plus alfalfa hay, grain at the rate of one pound to each four pounds of milk, and a 16 per cent protein supplement.

A very simple feeding setup for hay and silage is used. He built a platform of railroad ties along one fence line in the lot, and uses a ladder-like arrangement along the fence through which cows can feed. A shallow trough on the ground outside the fence line holds the feed.

How One of Illinois' Most Successful Hogmen Does It



Detailed "do's" and "don'ts" for how to succeed with hogs . . .

Condensed from Breeder's Gazette

Frank W. Bill

FRANK R. HUBERT of Saybrook, Illinois, does things on time.

Mr. Hubert started farming in 1919, raising hogs on one of the third class soil types in central Illinois. Over a period of 36 years, he has marketed about 33,000 hogs and now owns three other farms in addition to the original place where he started with five brood sows. Today there are 250 sows on Frank's farms, and his spring pig crop is expected to number about 1,800.

What is the secret of his steady progress? Mr. Hubert places top emphasis on these points: 1. Following a long term plan for soil building. 2. Breeding for increased production. 3. Careful sanitation. 4. Spread farrowing with pigs coming nine months out of the twelve. 5. Adequate feeding and watering. 6. Doing things on time.

On the Hubert farms, hogs are made to fit into a whole program of farming that brings direct income from the pork produced and increases the value of the land. Every farm Frank has had was completely run down or so badly out of condition that no one else wanted it. One farm produced only 25 bushel corn yields his first year; last year 75.

His present rotation is corn, oats and pasture. The basic soil treatment is limestone and phosphate as needed. Cornell estimates that 10 tons of manure are produced for each 1,000 pounds of pork raised. With fertilizer costs showing manure to be worth about $7 a ton, Hubert's land is getting some $28,000 annually in the value of manure left there by his hogs. For sloping fields, contour farming is practiced to re-

Reprinted by permission from Breeder's Gazette
Spencer, Indiana

duce erosion. And he makes full use of rye for early pigs. It is seeded right in alfalfa after the second cutting of hay and pigs go first on the rye. When fresh alfalfa is ready, pigs are moved to it with the rye plowed under for corn.

A top point in management, Mr. Hubert believes, is to have first rate producing stock. In recent years he has been trying to get more production through use of Swine Herd Improvement Association records. Litter weight records have helped. Breeding stock is selected from good type sows that have produced and raised eight to nine pigs and litters weighing 320 pounds at 56 days of age. Crossbreeding methods are used to secure added vigor. At present both Poland Chinas and Hampshires are crossed with Chester Whites. Various other combinations have been made previously, but the present trend is to Chesters.

Mr. Hubert was one of the first to adopt the system of swine sanitation, named for McLean County because it was first proved here in 1919. It provides for farrowing in carefully cleaned pens and houses and the hauling of pigs to clean ground where hogs have not been raised for a year.

In carrying out this system on the Hubert farms, individual hog houses are washed with hot lye water (1 pound of Lewis lye to 30 gallons hot water) and then steamed out before using. Even the wood gate sections of fence used for pens for each litter get the steam cleaning process before the farrowing quarters are made ready for the new crop of pigs. If possible, the individual hog houses are then hauled directly to clean, fresh pasture. If this cannot be done, hog houses are so located that the pigs never have access to ground surface that has had a chance to become infected with ascarid eggs or other dangers associated with old hog lots—such as necrotic sore mouths, necrotis enteritis and lungworm infestations. For early or winter pig crops, cobs are used extensively for paving of the hog lots. A thick layer of cobs keeps the pigs out of the mud, and the small houses are lined up in a row on top of the cob layer.

Mr. Hubert has found it profitable to have pigs come nine months of the year, in order to supply the market when it is most in need of pork. Since early pigs bring higher prices, the spring crop has become a winter crop. This year they started coming January 1.

Feeds fortified with antibiotics and B-12 vitamins are used for the young pigs, and are creep fed at first. With fortified feeds, Mr. Hubert has found pigs can often be weaned at six weeks. He buys prepared feeds. Pigs headed for

market are fed free-choice. The breeding herd gets hand feeding, even on ladino. While some have maintained that ladino clover alone is sufficient to maintain a sow, Mr. Hubert prefers a little feed in addition. Plenty of water is essential and he prefers to have the water and feed supply close together. He thinks it is a mistake to let hogs run some distance between the feed and water. To facilitate watering, pipelines have been laid wherever possible.

Mr. Hubert operated alone for many years, but since 1948 has had a partnership arrangement with Rodell Bielfeldt, who handles the principal chores. Many farm tours have gone to the Hubert farms, where charts show that efficiency is above average. Discussions on these tours have brought out some of these management guides that make for high efficiency:

Don't breed gilts at less than eight months of age. Have gilts farrow their first litter when pasture is available if possible; they won't suckle down so badly and will raise a better litter. Select the gilts when they are about four months old and feed them about two weeks before they are bred. Unless you have an outstanding sow she should not be kept after a third litter. *Test all gilts and boars for Bang's disease when they are about six moonths old* and more often if need be. This schedule should be followed with care because Bang's disease can wreck your herd in a hurry.

The longer you keep sows and litters separated from the herd, the better they do, although it is more work. Protein feed should be fed sparingly for a while after the sows farrow. No more than five sows and their litters should be put together for the first six weeks as a rule. Pigs put together should be about the same age.

Before sows are put in farrowing houses or lots, spray them with B. H. C. with about one pint of dip added to each 10 gallons of water. This will kill lice, mange, loosen all old scruf and also kill any germs that might be on her body.

Pigs should be sprayed when castrated and again when weaned with the same benzene hexachloride at the rate of one pint of the dip to each 10 gallons of water. After weaning, as many as 200 to 300 pigs can be kept together providing they have plenty of feeders, waterers and shelter. Mr. Hubert cautions—*keep the water out of the mud and keep mud out of the waterers.* Watch your feeders for *wastage.* Feed rooted out on the ground and tramped into the mud just adds to the cost of pork production. Keep your feeders and waterers on platforms or provide platforms in front. One feeder hole for protein is sufficient for each 255 hogs and one

feeder hole for grain for each 10.

Sunshades are essential in hot weather and can be made of poles and wire and straw. On the Hubert farms, the floor sections of the hog houses are often used for sunshades in hot weather. For cold weather farrowing, there should be brooder lamps in farrowing houses. When the houses are lined up in a row, a pole line can be run along the row and drop cords electrify the brooders in each house.

Mistakes to avoid include: Failure to repair houses and equipment when needed. Letting sows farrow in the pens before putting them in the farrowing house. Letting pigs get back in the old hog lots before they're three months old; they should be kept out on grass, away from all contact with the old lots. Never neglect vaccination for cholera. Frank Hubert's program calls for castration at four weeks and vaccination at six weeks.

Mr. Hubert has mastered his craft by patient perseverance and faith in the fundamentals. The man's attitude on life is one of the big factors in his success. He has served in many community projects and Farm Bureau activities and wherever he has served there has been the pleasant smile with its assurance that the job would be done as well as possible, without fuss or tension. Perhaps it is all summed up in that little suggestion he often has made, *be timely* in all operations.

Consumer Prices Still High But Farm Prices Drop

"Food prices are still high, but the farmer's share of the consumer's food dollar is down," says W. T. McAllister, Delaware marketing specialist.

"The farmer is now receiving only 46 cents of the consumer's dollar compared with the 50 cents received a year earlier. This is an over-all average, and some farm commodities are getting a larger price cut than others."

Food prices stay high even though farm prices have dropped because of increased marketing costs, McAllister explains. The Bureau of Agricultural Economics of the U.S.D.A. attributed these high marketing costs to increased wages for labor, higher transportation costs, and increased rents for storage and stores.

"Since no reduction of these costs is in sight, present food price trends are likely to continue through 1953," says McAllister. "Farm prices will remain low, but Mrs. Homemaker will find food prices still high."

Delaware Extension Service

How to Keep 'Em Running

Use PM (Preventive Maintenance) on your farm machinery . . .

Condensed from Western Farm Life

PREVENTIVE maintenance—called "PM" for short—briefly denotes the key to basic machinery maintenance — preventing breakdowns by making repairs before they are needed.

"PM" also calls for regular oiling and greasing, keeping bolts tight, and adjusting each machine for best operation. Good machinery operators follow a regular schedule of lubrication, inspection and adjustment — extending the useful lives of machines.

The little time required to check oil levels, batteries, filters and to use a grease gun is of inestimable value in keeping equipment in tip-top operating condition and getting the most out of it.

The operator — whether yourself, your boys or hired hands—is the most important controlling factor in any preventive maintenance program. A full understanding of the equipment is necessary to know when it is not functioning properly. When an operator knows his machine, what it will do, what its limitations are, and likes it, he can get everything out of it that the manufacturer designed and built into it.

The ideal program is to go over seasonal equipment such as plows, planters, cultivators, combines, pickers and other machines when their job is finished, and before they are taken off the tractor if they are mounted types.

The operator is then familiar with them, and it is easier to inventory their condition. Adjustments can be made and worn or damaged parts replaced. This permits ample time to get delivery on parts and have necessary repairs made so machines will be in good condition before they are stored away.

A good "PM" program starts with a regular, daily inspection. Before getting in the field in the morning, if it has not been done the night before, a routine check should be made of water, fuel and air cleaners. It is a good idea to check the fan belt and other main adjustments.

A weekly check includes the daily service, plus changing of engine oil and oil filters, checking

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Denver, Colorado

of the battery and oil levels in the transmission and final drives.

A monthly or 200-hour check repeats the daily and weekly service, along with lubrication of the starting motor, generators and fan idler bearings.

Since tractors, trucks and cars are used practically the year round, they should be subject to seasonal or periodic inspections. Service work can be done when they can conveniently be taken out of circulation.

Good grades of oil and grease are not luxuries. They assure correct lubrication of all friction points as the manufacturer intended. Follow the recommendations of the maker as to types and grades of lubricants and intervals of lubricating various units.

Maintenance of the cooling system consists mainly of making sure nothing interferes with the proper flow of cooling fluid and air.

The system should be drained after the winter and flushed thoroughly to get rid of rust scales and corrosives. Dependable commercial cleaning compounds are available. Follow directions for their use. Rust deposits must be prevented from forming in the system. Since rust inhibitors do not remove rust already formed, cleaning and flushing must be done before an inhibitor is used. Follow the manufacturer's recommendation as to the proportion needed.

Check all hoses and connections for wear and leaks. Replace where necessary. Water pump packing adjustments should be made if necessary, and connections tightened. The radiator core should be cleaned with a stream of water or air under pressure to remove dirt and debris. If there is too much wear in fan belts, they need replacing; otherwise, adjust them for correct tension.

Thermostats can be checked by operating the engine to see if the water in the block and cylinder head warms up while the water in the radiator stays cold. If the water in the radiator warms up as quickly as that in the cylinder head, the thermostat is stuck open. If the water in the engine becomes extremely hot while the water in the radiator stays cold, then the thermostat is stuck closed.

Care of air cleaners is important to assure long engine life. All connections between air cleaner and engine must be kept tight and dustproof. These should be inspected frequently. Pre-cleaners and oil-bath air cleaners should be serviced as recommended. Operating conditions will determine the frequency.

Check level of the water in the battery weekly or as often as necessitated by operating conditions. In extremely hot weather, frequent checking is essential be-

cause the water is used fast. Filler caps should be kept tight. A strong solution of soda will clean corrosion from the top of the battery and the terminals. Vaseline is a good preventive against corrosion for the terminals.

Be sure the starting motor and generator function properly and that the battery is being kept charged. Make adjustment of brushes as directed by the manufacturer. Trace all wires, looking for breaks and loose connections. It is better to replace a wire than just joining the ends and wrapping with friction tape. If bulbs in the lights are burned out or dim, replace them.

Action of the engine clutch needs attention. If slippage should occur, make adjustments according to the manufacturer's instructions. Should slippage still occur when adjustments are made, linings need to be checked for wear and replaced if necessary.

Brake pedals can be adjusted by following the recommendations. If slippage occurs after pedal adjustments are made, check linings for wear.

The hydraulic system should be inspected for leaks and faulty operation. Hoses and pipes that are damaged need replacing. On open systems, the breathers and cleaners require checking. Drain and flush the system and refill with the oil recommended. If for any reason there is doubt about the pump operating efficiently, it should be disassembled and inspected.

Tires need frequent inspection for correct pressure and cuts and bruises. Each manufacturer's recommendations on inflation pressures and on liquid content will give longest possible life if followed. If a cut has penetrated into the body of the tire, repairs should be made immediately to avoid further damage or destruction. Cuts in the tire tread area of sufficient size or shape to hold pebbles or dirt can be pared out with a sharp pointed knife working at an angle.

During a tire or tube change, examine the interior of the casing to be sure all dirt and water have been removed. Apply soap solution to tube and casing but do not get the solution under the bead of the tire which contacts the rim, because the casing may slip on the rim. Vegetable oil soap is obtainable from your tractor dealer. Inflate to seat the tube beads on the bead seat of the rim. Reinflate to the final recommended pressure.

Here are some tips for your own "PM" program:

1—Put rust preventive on moving parts when machines aren't in use.

2—Keep shields on power take-offs and other exposed moving parts. "The life you save may be your own."

3—Provide good shelter, conditioning and care of equipment in rainproof sheds.

4—Check belts for slippage. Slippage wastes power and time, wears out belts and other parts before their time and may cause fire.

5—Regular lubrication is important. Check grease cups and fittings often and be certain they're properly lubricated.

Lean Hogs Can Make Fast Gains

Hogs can produce lean, meat-type carcasses—and still make fast gains—under a breeding and feeding system used by the Ohio Agricultural Experiment Station.

Robison points out that systematic inbreeding and cross will give pigs a strong growth impulse so that up to usual market weights they tend to grow more and fatten less.

Outstanding among litters recently produced at the station were two pigs that weighed 227 and 213 pounds, respectively, at 137 days of age. The dam was a Poland-Duroc cross and the sire, a Yorkshire. After slaughter the heavier of the two pigs dressed out to 49.2 per cent in the primal cuts of loins, hams, New York style shoulders and bacon sides. Carcass length was 31 inches and backfat thickness only one and three-eighths inches. The second pig dressed out almost as well. Based on actual slaughter weight, both pigs were worth nearly $23 a hundred.

Another litter from the station was sired by an inbred Poland China and out of a Yorkshire-Duroc dam. The litter averaged 214 pounds at 152 days. Feed cost per 100 pounds of gain was $10.82. Until they averaged 120 pounds, Robinson fed this litter from a ration containing 60 pounds corn, 15 pounds oats, 8 pounds meat scraps, 10 pounds soybean oil meal, 5 pounds ground alfalfa, 0.15 pounds B vitamin concentrate, 0.15 pounds B-12 and antibiotic supplement and 1.7 pounds minerals. After the pigs weighed 120 pounds Robison increased the corn and cut down on the amount of oats, meat scraps and soybean oil meal. Other feeds remained the same.

Quality of the pork from these meat-type hogs was excellent, Robison says. The meat was tasty, low in objectionable fat, and more nearly met present consumer demands.

Ohio State University

Better Way to Raise Dairy Calves

Condensed from The Southern Planter

John P. Dietrich and John L. Morris

University of Maryland

IF A CALF is worth raising it is worth raising well. Dairy herd records show that the greatest calf losses occur between birth and 12 weeks of age. Many calves die at this early age because of poor management, infectious diseases, and improper sanitary methods.

Calf raising is one of the important problems on the dairy farm. Normally from 20 to 30 per cent of the dairy herd must be replaced each year. This means the dairyman must attempt to raise at least three heifer calves each year for every ten cows in the herd.

Successful calf raising begins with proper sanitary practices. Calves need to be born in clean, well bedded maternity stalls which are dry and free from drafts. Immediately after the calf is born, inspect it thoroughly to make sure that all mucus is removed from the nose and mouth. If the calf doesn't start to breathe at once, artificial respiration should be administered by alternately compressing and relaxing the chest walls with the hands.

In extremely cold weather rub the calf briskly with a clean sack to hasten drying and increase the rate of blood circulation. When the calf is thoroughly dry a clean sack may be used as a blanket to protect it from drafts and to help maintain body temperature.

As soon as possible after birth, paint the calf's navel with tincture of iodine to prevent infection from gaining entrance to the body at this point. Before the calf nurses, wash the udder and teats of the cow thoroughly with a warm chlorine solution and dry with a clean cloth, or paper towel.

It is highly important for the calf to get the first milk (colos-

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Richmond, Virginia

trum) because it is high in vitamin A value. Vitamin A is essential for growth, maintenance of health, and resistance to infectious diseases.

Colostrum also contains antibodies which help the calf develop resistance to bacterial infections. It may be a good idea to leave the calf with its mother for the first two or three days after birth.

The calf pen, like the maternity stall, should be thoroughly scrubbed and disinfected before the calf is admitted. All of the loose bedding material should be removed before the scrubbing begins. You can make a good cleaning solution by dissolving a one pound can of lye in five gallons of boiling water. A thorough scrubbing with this solution will usually destroy most of the infectious disease producing organisms.

As an extra precaution against infection, spray the walls and the floor of the pen with a three to four per cent creoline solution. The water bowl, hay rack and feed box should be thoroughly flushed with clean water before the calf is admitted. The pen should be dry before the calf moves in.

After the calf has been separated from its mother, it should be taught to drink whole milk from a standard open pail or from a nipple pail. The nipple pail has been developed in an effort to duplicate nature's method of feeding the calf. The experiences of dairymen show that feeding calves by the nipple pail method tends to reduce digestive troubles.

Regardless of what feeding method you follow, the feeding utensils must be thoroughly scrubbed after each usage. Digestive disorders are one of the common calf ailments which often result in scours, followed by pneumonia. A strict sanitary program in the calf barn is a must for success.

During the first few weeks, the calf must not be fed too heavily on milk. Overfeeding will cause digestive disturbances followed by scours. A good rule to follow during the first two weeks is to feed the calf one pound of whole milk per day for each 10 pounds of body weight.

Calves of the larger breeds should receive 7 to 10 pounds per day the first two weeks and the smaller breeds 5 to 7 pounds per day. Weigh the milk at each feeding and make all changes gradually in order to avoid digestive upsets.

The milk should always be fresh and clean, and should be fed at a temperature of 100 degrees Fahrenheit.

If a milk substitute is to be fed, and there are a number of good ones on the market, follow directions of the manufacturer carefully. These commercially prepared milk substitutes were devel-

oped to save whole milk and cut the cost of raising calves.

Mark the calf or number it in some way before it is separated from its dam. Eartags are a very common method of identification for grade calves. Animals that are to be registered must be sketched, photographed or tattooed according to the regulation of the breed association.

Leather neck straps or neck chains with numbers attached may be used until tattoo marks, eartags, photographs or sketches are made for permanent identification.

Individual calf pens are very desirable for young calves. This is especially true while the calves are receiving milk. If a number of calves are housed in one pen, equip the pen with stanchions or ties. This will separate the calves at feeding time.

Feed grain immediately after the milk has been fed. Individual pens should be not less than four by six feet in size. Build the partitions between the calves of some smooth, solid material so that they can be thoroughly cleaned and disinfected. Solid construction also aids in the prevention of drafts.

Many kinds of calf starters now on the market give satisfactory results. Some of these are sold in the form of dry meal and others in pellet form. Calves should be encouraged to eat the concentrate mixture as early as possible. One way to do this is to place a little of the concentrate in the mouth of the calf after it has finished its feeding of milk.

Grains which are cracked or crushed are more palatable to calves than those finely ground. A small handful of the grain mixture placed in a clean feed box is sufficient to start the calf. The feed box should be kept clean and a fresh supply added daily.

Early cut, mixed legume and grass hay which is well cured, green in color, and free from mold makes an ideal roughage for calves. It should be offered free choice to calves as soon as they will eat it. They will usually start eating hay at about two weeks of age. Small amounts of fresh hay should be supplied daily.

Most dairymen will agree that silage has no place in the ration for calves under four months of age. Pasture is an excellent feed, but it is too bulky for young calves. Calves under four months of age will normally grow and develop more rapidly if fed hay and grain and allowed to run in a small paddock for exercise and sunshine.

The calf needs plenty of clean, fresh water at all times. This is especially true where a minimum amount of milk is fed. As soon as the calf begins to eat dry calf starter, plenty of water should be available to meet his daily needs.

How Much FEED Per Dozen EGGS

Feed cost records can lead to more rigid culling and higher profits

Condensed from Poultry Tribune

J. H. Claybaugh

University of Nebraska

LAYING flock owners can borrow a trick from broiler growers to make their flocks more profitable.

The yardstick by which the success of a broiler grower is measured is his feed conversion—how many pounds of feed is required to grow one pound of broiler. A measuring stick of success for the egg producer could be the feed cost of producing a dozen eggs.

High feed costs and lower egg prices squeezed much of the labor income away from poultry producers during 1952. Even efficient poultrymen, who have special markets for their eggs, marked down 1952 as a year of low income. The experienced egg producer has weathered such lean years before. How do they do it? They keep records so that they can find where their birds are falling down.

One good way to check on your flock to see that they are doing a full day's work is to use feed efficiency records. About 73 per cent of the total expense of producing eggs is feed costs. So that is a good place to start in trying to make the laying flock more profitable. Feed efficiency in the laying flock is figured on the cost of producing a dozen eggs. Of course, the feed cost of producing a dozen eggs varies with the price paid for feed and the pounds of feed used. There is little the poultryman can do about the price paid for feed, but he can do something about the pounds of feed used.

High production and high profits go hand in hand. For example, with the laying ration costing $5 per 100 pounds, a five pound hen laying at the rate of 70 per cent production will produce a dozen eggs at the feed cost of 24 cents. This same hen laying at only 40 per cent production will produce eggs at a feed cost of about 35 cents per dozen.

When either feed costs or feed utilization rises, the feed cost of producing eggs becomes a higher

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Mount Morris, Illinois

percentage of the total production expenses. In 1950 when the average feed cost was $3.45 per 100 and the average unit of production of the Nebraska cost account records flock was 201 eggs per hen, feed costs made up 80 per cent of the total cash expenses.

During the seven year period, 1936 to 1942, when the average feed cost per 100 pounds was only $1.57, feed costs made up only 70 per cent of the total cash expenses.

A flock of 100 five pound hens laying at 10 per cent production will require 23.2 pounds of feed to produce a dozen eggs. This same flock producing at 50 per cent will require only six pounds of feed per dozen eggs; and at 80 per cent production they will require only 4.4 pounds of feed per dozen eggs.

Final results of the 1952 New York Random Sample Laying Test show what high production and high feed efficiency can do to the total profit picture. The entry in this test which made the best record had an average return of $3.30 per pullet over feed costs.

These hens produced 223.6 eggs each on a hen-day basis for the 340 day period. The hens laid at an average rate of 67.3 per cent. Average hen weight for the entry was 4.44 pounds each.

It took 5.2 pounds of feed worth 23.4 cents to produce a dozen eggs. For each dollar's worth of feed, this pen of hens returned $1.88 worth of eggs.

Pounds of Feed Required to Produce 1 Dozen 2-Ounce Eggs by Birds, Without Gain or Loss in Weight, Laying at Specified Rates:

Eggs Per 100 Birds Per Day	Weight per Hen 4 lbs.	5 lbs.	6 lbs.	7 lbs.
10	20.3	23.2	25.9	28.4
20	11.0	12.4	13.8	15.1
30	7.9	8.9	9.8	10.6
40	6.4	7.1	7.8	8.4
50	5.4	6.0	6.6	7.1
60	4.8	5.3	5.7	6.2
70	4.4	4.8	5.2	5.5
80	4.0	4.4	4.7	5.1

Another entry in the New York Random Sample Test lacked $12.82 of producing enough eggs to pay for feed and chick costs. These pullets averaged only 154.5 eggs each. Their average rate of production was only 45.5 per cent. It took 8.5 pounds of feed worth 38.3 cents to produce a dozen eggs in this pen of hens.

One advantage of feed conversion records is that it shows up flaws in the management system or proves that a good management system is being carried out. With an accurate record of daily feed consumption, the poultryman should be able to spot approaching trouble immediately when feed consumption drops.

Such records make it easy for several people to help with the daily chores. Yet, they assure the manager that feeding instructions are being followed.

The good poultryman foretells trouble ahead by a decrease in the appetite of his flock. Perhaps more or brighter lights are needed, or an appetizing teaser feed, or medication. The poultryman often has to decide what faulty management practice to correct. The operator that keeps a careful watch on his feed conversion rate is the type who does timely culling.

The farmer who wants to increase the size of his flock may have to establish a credit rating based upon his success with a smaller flock. Feed conversion records are something which a banker can easily understand. Since feed conversion records are valuable in so many different ways, they can be considered as one of the necessary signs by which a poultryman can prove his worth.

The best way to keep an accurate record of feed efficiency is to weigh the amount of grain and mash fed each day. A small chart kept on the wall of the laying house will simplify record keeping.

When the daily records show the number of hens in the room, the number of eggs laid, and the pounds of mash and grain fed, the feed conversion rate can be computed easily.

Examples of how feed conversion factors will help to spot faulty management practices can be found on almost any farm where this system is used. Feed wastage from feeders, rats stealing feed from hoppers, and a host of other troubles will cause the feed conversion rates to be too high.

Once these troubles are spotted, the cause is usually easy to correct. Feed conversion records can point the way to bigger and better profits. So why not make your laying flock more profitable by using feed records as your management guide?

Artificial Breeding Is Big Business

Last year 4,295,243 cows were bred artificially throughout the United States. A gain of 785,670 cows—or 22.4 per cent—was shown over the previous year. For the country as a whole, 18 per cent of the dairy cattle population is now being bred artificially.

Wisconsin again led all states with 810,070 cows being bred artificially. Minnesota was second with 361,607, and Pennsylvania was third with 327,124.

"It certainly would seem that artificial breeding of dairy cattle is here to stay and that farmers believe it is one of the ways by which they can better their average production per cow," commented an extension dairyman.

USE A NEW MOW DRYER AND GET —

Hay in the Mow By Suppertime — Everytime!

Condensed from New Jersey Farm and Garden

Mark E. Singley and Bruce R. Poulton

WITH the eight hour day that labor is beginning to demand on the farm, it's a big relief to be able to cut five or ten acres of hay at a time and predict with certainty that it will be in the mow before suppertime. That day is here for the farmer who is using 1953 methods of barn drying.

It isn't only the labor problem that has increased interest in artificial drying. Right now, many farms are handling more hay than ever before as they swing to grassland farming. Higher yielding varieties are being grown, which means more tons to the acre. Finally, recent experiments at Rutgers and elsewhere have shown that cows can handle much more high quality hay than we thought probable. That cuts feed costs.

So the demand for hay is increasing and we have more of it, but less labor to handle it and less working time. Finally, there's always the weather—catchy at best. For that reason, barn curing of hay is growing more popular.

The farm crops department at Rutgers recently completed a four year survey of the quality of hay New Jersey farmers were producing. Only 18 per cent of it graded U. S. No. 1, 44 per cent graded U. S. No. 2, and 19 per cent graded U. S. No. 3. Finally, 17 per cent rated Sample Grade and we lost about another two per cent in hay not worth taking off the field.

Field Curing Takes 3-5 Days

What can we do to improve the quality of hay?

First, you can't get more feeding value out of hay than exists at the proper stage of maturity. To cure the legumes in the field for hay usually requires three to five days, depending upon yield and time of year. But during haying season in New Jersey, weather records show that it rains about

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Sea Isle City, New Jersey

one-third of the time, the sky is overcast another third of the time and we have ideal hay making time only one-third of the time.

It is seldom we have more than two good hay making days in succession in May, June and July. Most dairymen will agree there are few times when hay can be field cured during first cutting. The best weather sets in after the crop has passed the proper stage of maturity.

So this idea of preventing nutrient losses alone makes a good case for barn curing. We need only two days for partial field curing and if a farmer uses a hay crusher, he can reduce moisture content to 40 per cent in one day.

This means we can make smaller quantities of hay at a time, but select the best drying weather for it. By taking small "bites," so to speak, we can finish a field while it is in the proper stage of maturity instead of waiting to take one or two big bites, and finding that the crop has gone "stale." Thus, with barn curing, we don't have to cut 20 acres at a time and wonder if it will reach the barn before it is damaged by rain. For small total acreages, we can cut seven to ten acres at most, sometimes as few as five. This requires a smaller labor force and one can plan to fit work into that eight hour day we mentioned.

You Get More Hay

Now to those other advantages: Farmers using barn drying have learned that with complete recovery of the crop, yield per acre stored has shot way up. Sometimes it represents a surplus, and the farmer can add more cows to the herd or sell good, bright hay to others. Quality barn dried hay commands a good price today. Barn curing also gives hay a more uniform quality, hence results in uniform roughage.

First of all, you don't need heated air to cure hay in the mow. At the experiment station we have made quality red clover and alfalfa baled hay even when brought in at 50 per cent moisture content. To do this we used an air flow of more than 50 cubic feet of air per minute for each square foot of mow floor area . . . just about double the standard recommendation. We wanted to be sure it would dry without molding.

From two to nine days were required to dry hay added to the mow. It cost about $2 a ton to dry hay from 30 per cent down to 14 per cent. The more moisture there is in hay, the more it will cost to dry it. We would put the average cost at $3 to $4 per ton on a dry weight basis.

Heat has some advantages. For instance, we utilized the heat from an internal combustion engine that drove the fan for drying (everything else was the same as for the natural air project de-

scribed above). This heat raised the temperature of the drying hay six to seven degrees and it dried in one-third less time. There was less mold and the cost per ton for drying wasn't much higher. However, the engine required much more attention than an electric motor. Lead deposits in the gasoline caused plug and valve failures. We suggest using an electric motor for the fan.

There is no doubt that long and chopped hay can be dried in the barn if air is supplied at a minimum of 25 cubic feet per square foot of mow floor area, and if the hay goes into the mow at not over 45 per cent moisture. For baled hay, care should be taken that bales are formed loosely in the field, packed tightly in the mow. Don't allow any spaces between bales and make sure no bales overhang at the edges. Taper the stack neatly from floor to ceiling.

Of course, what all of us want most with barn curing is to reduce the labor load to a minimum. For instance, to dry hay from 40 per cent to 20 per cent you have to get rid of a third of a ton of water! If much physical labor is involved, this extra weight is a real disadvantage.

Long hay takes extra hand labor to make the load and distribute it over the drying system in the mow. If you use a forage blower to elevate it, chopped hay can be moved without hand labor, so the extra weight is no problem. To barn dry baled hay, the extra weight is usually handled several times unless an elevator and conveyor are used. At that, one would favor a small bale.

By chopping and blowing hay, using modern equipment, the hay is never handled. The same machinery used to harvest and handle grass silage can be used for chopped hay.

Dusty Hay Unnecessary

"But chopped hay is too dusty to handle in the mow and to feed," some dairymen tell you. This opinion is unfortunate. Dust usually has resulted only from improper handling or improper drying.

Chopped hay packs more tightly than either long or baled hay. This makes it more difficult to dry. You can get around this when designing your system, allowing plenty of drying capacity. Finally, chopped hay is difficult to handle when dried because it becomes fluffy. It requires a large feed cart to carry an appreciable weight.

For this reason, the ideal way to handle chopped hay is to dry it in a self-feeding structure and let the animals feed themselves. This appears to be the trend of the future for the farmer who can store in one place. It involves no hand labor from field to animal . . . and labor is becoming a priceless commodity on the farm!

SMALL FARMS Can Pay BIG

On his 75 acres, Vern Kohlstrand grosses $12,000 a year while cutting costs to the bone . . .

Condensed from Hoard's Dairyman

William G. Schulz

LET'S not be too quick to write off the small scale dairy farmer as gradually on the way out, even if this does appear to be the case in many of the country's major milk producing districts.

There's still a place for the small milk producer, able and willing to adjust to modern requirements. That's well proved by Vern Kohlstrand's one man grade A dairy.

His 75 acre farm lies about 35 miles northwest of Portland, Oregon, in the rich Columbia river lowlands. There Kohlstrand milks 16 to 18 cows, having about 25 head of stock in all. He also raises 20 acres in processing peas, keeping the vines for silage, has 20 acres of pasture under sprinkler irrigation, and 35 to 40 acres in hay and grain.

Kohlstrand was producing milk for the bottled trade as far back as 1939. But many and far-reaching are the changes that have taken place in his operation since then. "In years past, I had to work out — there wasn't enough money in the farm alone," he recalls. Yet his income today is grossing up to $12,000 annually.

Not any one thing, but a combination of factors has made possible this gradual upgrading of the Kohlstrand farm into a more profitable business. The keynote throughout has been a gradual revamping of all facilities and methods to cut time, labor and expense.

His big wooden dairy barn— massive, solid, substantial — was built 35 years ago in the old style but has been modernized to meet strictest grade A requirements. A new milk house, of latest design and facilities, was added several

Reprinted by permission from Hoard's Dairyman
Fort Atkinson, Wisconsin

years ago.

The herd has been placed on standard plan DHIA test, and is being steadily improved through the use of artificial insemination. As for Kohlstrand's land, that has been gradually developed to a high state of productivity through use of conservation farming methods. The accent is heavy on grassland, along with crop rotations and a liberal use of fertilizers.

For years, this dairyman has done all of his own field work and barn chores — even most of his own building and repairs. He hires help only for a few days each year for silage, hay and grain harvest.

One of the main reasons for his dairy profits has been the maximum use of home grown roughage feeds — pasture, hay, silage. Thereby he has held down feed costs yet kept up milk flow to a high level. At the same time he has improved his feeding methods.

For years he was a heavy grain feeder. That was because he had a small eight foot silo and little silage for his herd. He was forced to feed as much as 400 pounds of grain daily to 20 cows. Then last summer he put up a larger silo, a 12x30 structure holding 75 tons of pea vines.

The benefits were almost startling. Last fall and winter Kohlstrand was able to reduce his grain feeding in half as he increased the silage ration to an average of 45 pounds per day per cow. Yet milk flow, during most of this time, held up even better than when he fed lots of grain. He also had less trouble with mastitis. The net result was that he cut his winter feed bill by $100 per month.

Let a few figures from his monthly DHIA reports tell the story. He started his heavier silage feeding late in October and continued until cows went out on grass in the spring. Early last year his records showed the following averages per cow:

	Lbs. Fat 1951	Lbs. Fat 1952
February ..	30.9	38.3
March	35.1	44.4
April	38.2	45.2

Note the gain over the year before, even though concentrates had been cut 50 per cent. For the three preceding months—November, December, January, the seasonally low production period—Kohlstrand's cows averaged 33, 31 and 35 pounds fat. This was just about the same as for the same three months the year before. Over this full six month period, Kohlstrand produced more milk than for the same period a year earlier, and at considerably less cost. There's indication now that his 1952 DHIA average will hit over 400 pounds fat.

Kohlstrand held down the silo's

cost by constructing it without scaffolding. He followed plans devised by Oregon State college engineers for building wooden stave silos. Total cost, complete with roof, doors and chute was only $400. Half of the staves used were from the old silo; the rest were new ones.

Kohlstrand also made use of the old silo rods. These he took to a blacksmith who lengthened them by welding on extensions. "Of course, I got an unusually good buy on lumber, so my cost ran lower than for most silos of this same size and construction," he comments. (One of his neighbors recently built an 18x32 foot silo of 150 tons capacity by the same method. Made wholly from new materials, it cost $1,000 complete.)

The main structural parts of Kohlstrand's silo were erected in one day. He himself did the work, though he admits he had the helping hands of two capable workmen who dropped over to the farm that day. Columbia county agent, W. G. Nibler, and extension agricultural engineer, M. G. Huber of Oregon State college, were his two aides. (Note: Complete plans and construction details for silos built by this method are available in an extension bulletin published by Oregon State college, Corvallis.)

"The finishing touches, such as the roofing, stapling of the rods, and putting on the chute, I did off and on during the next few days," Kohlstrand says.

Since 1938, Kohlstrand has been raising processing peas—at first only on a small scale but lately 20 acres. These are contracted to a near-by freezing plant. But it wasn't until he had his larger silo that he was able to take full advantage of this low cost by-product feed produced right on his farm. Vines are trucked in immediately after pea harvest, put through a chopper, and blown up into the silo.

No preservative is used. Vines are allowed to settle several days, then the silo is refilled. Later, early in the fall, Kohlstrand gives it a final refill with about six feet of chopped corn.

A large quantity of juice always drains from ensiled pea vines. To prevent this loss of valuable nutrients, Kohlstrand tried the experiment of putting several feet of chopped hay in the bottom of the silo, before any pea vines went in. This acted as a sponge, absorbing much of the juice and reducing liquid run-off. By April, when he had fed down to the hay, he found it fresh, sweet and mellow and rich in silage juice. "In fact, our 1951-'52 silage was the best we ever had," he stated.

Putting in a sprinkler irrigation system on 20 acres of pasture four years ago was another forward step for Kohlstrand that has paid

big dividends. No longer is green feed during the dry summer months the problem it used to be. Year after year, formerly, he raised a few acres of corn and some 10 acres of sudan grass. "This was a help in keeping up the cows' summer milk production, but it couldn't begin to equal irrigated pasture," he said.

"Besides, that meant a lot of extra work planting and cultivating. The cows harvested the sudan grass themselves, of course, but corn had to be put through a cutter and fed to them. But now we've eliminated all the work of growing and feeding these annual crops. I used to have to feed a lot of hay and grain in summer, too, but those have been cut way down. In fact, cows out on good pasture will eat little hay and require only a little grain."

All last summer when the Pacific Northwest baked and browned under one of the hottest and driest summers in years, Kohlstrand found his irrigated pasture continually getting ahead of his cows. He even cut two hay crops from it. It is a mixture of alta fescue, ladino clover and volunteer white clover.

Kohlstrand usually starts irrigating about early May, though he will begin late in April if the spring has been dry, and continues until mid or late September. Sprinklers are run in two 12-hour settings, 24 hours a day, during most of the pasture season. His irrigating power cost averages $45 per month.

His irrigation system, complete, cost $2,100 four years ago. (It would cost more today.) There was an additional cost of $300 for a power line which Kohlstrand ran in from the road. Total $2,400.

"I figure it easily paid for itself in three years, and probably sooner," he states. "I've cut down my summer feeding costs, and I am getting more milk than formerly during the dry pasture season."

The 20 acres of irrigated pasture are divided by electric fence into four grazing units, which are pastured in rotation. Heavy fertilization is a "must" for irrigated pastures, more than for nonirrigated, Kohlstrand emphasizes. He applies barnyard manure over all 20 acres. He also puts on 300 pounds of 20 per cent superphosphate and 100 pounds of 33 per cent ammonium nitrate per acre each year.

This nitrogen fertilizer is applied through the sprinkler irrigation system in July. It is first mixed with water in large oil drums set up near the pump. "I have one valve that fills the barrel with water and another that draws out the mixture through a suction pump," Kohlstrand explains. There it mixes with the irrigation water and is carried through the pipeline out onto the

fields."

Rounding out his homegrown feed production are 15 to 20 acres in rye grass, red clover and ladino clover hay and about 20 acres in oats. If quality is high, oats are sometimes sold for seed and oat harvest provides plenty of straw for all farm needs. He always has sufficient hay for his own stock and usually some to sell besides.

Glance inside the big dairy barn, in the section where Kohlstrand feeds and milks, and you'll find all facilities in a close, compact s t e p saving arrangement, minimizing barn chore time and labor. Floors and mangers are all of concrete. There are 10 stanchions on one side, six on the other, with feed bins filling out the latter side. A broad alleyway runs down the center.

One end of this alley connects with the silo; so, as silage is pitched d o w n, Kohlstrand has only a few steps in carrying it to the mangers. Likewise, at the opposite end of the alley, hay lets down from the barn loft. This, too, can be forked out to the cows with only a few steps to each manger. As for the milk house, that's only about 40 feet away from the farthest point among the cows. Kohlstrand uses two units of milking machines. The rest of the barn is given over to storage of hay, feeds, machinery and miscellaneous items.

But why, some may ask, doesn't Mr. Kohlstrand milk more cows, since his land easily would produce enough feed for a larger herd? Kohlstrand's answer to that is simple and to the point: "A larger herd would mean I would have to hire help. That would mean a larger gross income but my net would be little if any greater.

Exhaust Color Helps Locate Tractor Trouble

Sometimes you can locate trouble in your tractor by the color of the exhaust. For example, a bluish smoke shows that oil is burning in the combustion chamber, says Wendell Bowers, extension agricultural engineer.

Oil in the combustion chamber means that valves or piston rings are worn or stuck. Bowers suggests that you have your local dealer find and fix the trouble before it gets worse. If black exhaust comes from your tractor, it is probably eating up more gas than is necessary because the air-fuel mixture is too rich. Some causes of black exhaust include improper float level, too rich a load adjustment on the carburetor or a plugged air cleaner. *University of Illinois*

Silage Puts GAIN, Not FAT on Lambs

Condensed from The Farmer

CORN silage will put gains on lambs but it won't fatten them for best market weights. Heavy lambs, especially, can't be finished fast enough on silage to hit the market at near-hundred pound weights.

Five hundred farmers learned that from trials completed by the West Central Experiment Station of the University of Minnesota.

Heavy lambs, fed good quality corn silage and either alfalfa hay or protein supplement will not fatten sufficiently and still reach market weighing in the neighborhood of 100 pounds, P. S. Jordan, who made the test, told the group.

Not even a half ration of corn will push lambs weighing 75 pounds at the start to proper finish at under 100 pounds. "Starting lambs on a half feed of grain gave better results than withholding it during the early part of the feeding period," but for best finish a full feed of corn is needed with the corn silage and alfalfa the last half.

"There is no economy in gains from attempting to save grain during the first of the feeding period when silage is used," Jordan reported. Without corn, lambs made .25 pound daily gains; with it, during the last 28 days of feed, they averaged .32 pounds per day from a half ration of corn, corn silage and alfalfa.

Jordan saw nothing wrong with silage as a lamb feed, however, under proper conditions. "Roughage alone will put cheap gains on light lambs, but it won't get them fat. Feed silage, if it fits your operations, but add grain for fattening," was his recommendation.

The same was true of corn cob meal—"feed it if it fits your operations." Lambs self-fed corn and cob meal and alfalfa did as well as those self-fed shelled corn and alfalfa. The corn cob meal had an advantage over self-fed corn of reducing danger of death loss from overeating. "Diluting corn cob meal with additional cob allowed lambs to be started directly on the self-feeder," Jordan reported. A disadvantage of corn cob meal is that it heats rather rapidly. Feeders cannot be filled with a week to 10 days supply.

Soybean oil meal is a more economical supplement than Purdue

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St. Paul, Minnesota

Supplement A for lambs, at least when fed with corn silage and shelled corn as under the experiment station conditions. "To get the same protein content, .4 pounds of Supplement A was needed daily to equal .3 pounds of soybean oil meal," Jordan reported. "Feed cost per hundred pounds of gain was $3.28 in favor of soybean oil meal."

Alfalfa hay is still a cheaper source of protein for fattening lambs than either soybean oil meal or Purdue Supplement A.

No definite proof that vaccination will give better results than not vaccinating against overeating disease (enterotoxemia) is available, either from trials or from experiences of feeders, "but it's good insurance." Vaccination isn't a cure-all for poor management, however.

Stilbestrol will increase weight gains and feed efficiency, but it also increases carcass shrink in the cooler. Until more studies are completed, feeders who use it may have trouble getting top prices once packers have taken a loss from shrinkage on their lambs.

Aureomycin gave no help in controlling scours in South Dakota trials, nor did it add to weight gains or feed efficiency. It did reduce death loss somewhat. "Surface active agents" (detergents) showed no benefits in feeding lambs.

Grass silage will do as well as corn silage in adding weight, but it won't fatten lambs fast enough to make top finishes at near 100 pounds.

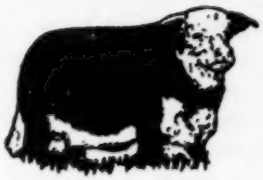
Shearing lambs that go into the feedlot after Christmas seems to pep up their appetite for John Olson, Worthington, Minnesota, feeder. Chopping coarse alfalfa has given him as good gains as good quality hay. Mixing hay and grain has "almost eliminated" death losses.

Keeping ice out of water—not warmed but ice free—has reduced pregnancy disease in ewes at Iowa State college.

New USDA Booklet Gives Information on Futures Trading

The U.S.D.A. has prepared a new leaflet aimed at meeting growing demand for popular information on futures trading. The leaflet outlines the major work of the Commodity Exchange Authority in supervising futures trading on markets such as the Chicago Board of Trade and New York Cotton Exchange. Copies of Leaflet No. 330, "Commodity Exchange Act and Commodity Exchange Authority," may be obtained from the Office of Information, U.S.D.A., Washington 25, D. C.

BEEF CATTLE CYCLES: Can We Minimize Them?



If the peaks and valleys in prices and production could be leveled out, the industry would be saved many a headache

Condensed from The Hereford Journal

Leon C. Hurtt

Range and Ranch Consultant

FOR years the cattle industry has been bedeviled by quite regular cyclic variations. A high peak in numbers has been followed by a sharp decline that caused a discouraged, pessimistic attitude among ranchers for a few years until better prospects and improving prices set the stage for another upswing of cattle numbers. The whole rise and dip process then develops into another cycle. These sharp peaks and dips in numbers are largely responsible for a series of peaks and valleys in cattle prices, but unfortunately, peak prices usually occur two or three years before numbers reach a peak.

If we ignore for a moment the several quite regular cycles and the minor short time variations, it becomes clear that the major long time trend in cattle numbers has been gradually upward. This has been at an average rate of close to 400,000 cattle per year for the past 60 years or more.

From 1890 to 1945 four distinct peaks and four deep valleys appear on the trend curve of cattle numbers. From the peak of 74,000,000 in 1934 to the next one of 82,400,000 in 1944 was only 10 years, but the preceding three cycles averaged approximately 15 years from peak to peak or valley to valley on the curve. The normal interval has been considered about 15 years except when a severe, widespread drouth, a world war and certain other unusual forces helped to shorten the interval, 1934 to 1944.

However, the major long time trend has been upward, from about 55,000,000 cattle at midpoint of the curve in 1890 to

Reprinted by permission from The Hereford Journal
Kansas City, Missouri

about 75,000,000 at midpoint of the peak in 1944. Cattle numbers have been trending upward again for the past four years and it is uncertain when the peak will occur or how high it may be. Some have estimated up to 98,000,000 or more cattle at the next peak. Right now we have more than ever before—93,700,000 head.

What generates cattle cycles and why do we have them? Several students of this subject agree that majority attitudes or mass psychology of cattlemen is a basic element in cycles. It works something like this. After cattle numbers have been abnormally low for two or three years, the sentiment among producers changes to a more optimistic outlook. As breeding herds begin to build up, the favorable sentiment induces other producers who may have been on the fence to join the parade.

Profits and prices are normally quite favorable in at least the early stages of this upswing in cattle numbers. As more producers decide to increase herds, fewer cattle go for slaughter. It becomes increasingly difficult to buy females even at higher prices. As this situation develops to an abnormally high cattle population on hand or in prospect, some prudent operators realize that trouble is brewing over the growing imbalance.

But the upward momentum often carries on to a new peak in numbers even after a serious break in prices occurs. Increased marketing eventually becomes necessary to relieve overstocked ranges and to rebuild feed reserves. The surplus of cattle numbers usually comes to market at unsatisfactory prices and a pessimistic outlook again develops.

If such is a reasonable explanation of how cattle cycles are generated, as I believe it to be, then why do we continue that same unfortunate habit time after time? Well established operators with outfits adapted primarily to cattle production are the main victims of these unnecessary peaks and dips. Perhaps the speculators and in-and-outers are chiefly responsible for the rapid buildup of cattle numbers as prices start to improve. They rush in to buy and force numbers and prices still higher. They hold females off the market to build up herds, and, incidentally, this increases competition for range and winter feeds. Finally, general confidence is shaken, a break occurs and prices turn downward. The Johnnie-come-lately is now forced to liquidate which helps to flood the market. In disgust he and others in his group then get out. The old established cattle rancher must keep plugging away through another period when cattle numbers and prices are both unreasonably low.

But let's be realistic in this analysis in an effort to find a remedy. Some of the old-time, tried and true ranchers (maybe only the younger ones) also caught the buildup fever and started to increase herds with questionable justification, stability considered. With 10 or 20 per cent more cattle, just look what my sales slips would add up to, the old-timer reasons. It's hard to resist, so he holds some of his steers over another year or keeps extra replacement heifers to build up. "If they are worth going prices to the numerous buyers, they are worth as much to me," he believes. This attitude helps the speculators force cattle numbers upward.

Also it helps reduce the amount of beef available at the meat shop at prices the housewife is willing to pay. Finally, she says, "Okay, I'll buy pork, fish, poultry or lamb." At about this stage there is one way for cattle to go, and that is down. Thus, the old-time operator with a ranch well adapted to cattle production on a stable level has helped the speculator to periodically build up numbers and prices to unrealistic levels. Forced liquidation then becomes the painful way out.

Cyclic changes in numbers are closely related to peaks and valleys in price trends but the timing is distinctly different. Cattle prices tend to reach a peak two or three years before numbers hit their peak. Increasing numbers cannot all be marketed immediately when prices begin to break sharply as was true late in 1952. Thus, the rancher who started to increase his herd after many others had done the same has the unhappy experience of selling the surplus on a declining market. If he paid $300 to $350 for mother cows, as in 1951, and had to liquidate heavily at prices prevailing the past few months, it may take a long time to recoup the loss, particularly if the momentum carries on to a peak of 95,000,000 to 100,000,000 cattle. Fortunately, we have full employment at good wages and our population is increasing rapidly.

How can a gradual and desirable upward trend in cattle numbers be smoothed out so as to avoid those unfortunate high peaks and deep valleys? If mass opinion — made up of over-optimism alternating with faint confidence or pessimism as briefly outlined above—is a basic reason for cycles, then we have a clue to the remedy. Avoid these extremes, keep numbers on an even keel but trending gradually upward, in gear with demand and human population trends. That should minimize numerous bad effects of cyclic trends in numbers. Granted that this is easier said than done, it is one step that is clearly essential and workable, if taken by

a majority of operators. Even if only a minority take it they should reap some benefits from avoiding the worst extremes.

First, let us agree that it does little good to blame the speculator, the party who rushes into the cattle business rashly when everything is rosy. If the speculator and his banker insist on boosting cattle numbers toward an unwarranted peak, we can do little to stop him. However, a few new get - rich - quick operators cannot boost cattle numbers to a very high peak unless they have a lot of help from the rank and file. It must be conceded that too many operators, both old and young, who are not really speculators, do get the fever and increase their herds beyond a safe, stable limit of the spread. This may cause over-use and damage to the ranch and the stretching of feed reserves too thin to safeguard the herd during a long, severe winter or drouth period. Increasing cattle numbers without assurance of ample reserves is always a risk, but the danger is multiplied when a a peak in numbers is clearly developing.

There is no compelling reason for prudent, stable operators to blindly follow the lead of speculators in building up cattle numbers to unwarranted peaks. Good statistical records are promptly available to show trends of cattle and human populations, in demand for beef, and other controlling factors. No prophet is needed because these data provide reliable guides to operators who will use them rather than follow some current speculative trend. Unfortunately, records extending back to 1890 indicate that speculators have had enough support from the rank and file operators to develop the five cyclic peaks and valleys cited.

* * *

Raising fish in rice fields has proven profitable to a group of farmers near Lonoke, Arkansas. Sometimes the farmers harvested 1,000 pounds of fish per acre—which sold for 25 cents a pound. At the same time the fish were growing—the productivity of the land for rice was increased. In one instance — after a two year fish crop, the rice crop yield increased from 60 bushels an acre to 100.

* * *

It should, of course, be recognized that even if regular cycles in numbers were ironed out to a smooth trend, some price fluctuations would still continue. Prices vary in response to demand, to employment, wages, drouth and many other factors that currently affect business activity. Regular cycles in cattle numbers are, however, severe handicaps generated primarily within the industry that tend to accentuate undesirable price variations.

Are You Digging Too Deep With the FEED SCOOP?

If you are wondering whether your cows are getting to much grain and not enough roughage, or vice versa; read this timely article

Condensed from Successful Farming

F. B. Morrison as told to William Ward

DAIRYMEN have been hearing two feeding stories lately. One goes like this: Feed only roughage to cows for the most profitable milk production. The other is this: Feed liberal amounts of grain and supplement with all the good roughage cows will eat.

Which story is correct? *Actually, neither one.* But between these two ideas there's a happy medium that can mean a bigger income from dairying for you.

Many experiments in recent years have shown you can cut way down on your feed costs by feeding only good quality hay and silage. Other experiments have pointed out that you can push milk production high by adding all the concentrates a cow will eat with good quality forage.

But, for the greatest profit—the most milk for least feed cost—a great number of experiments show you need to feed *both* roughage and concentrates.

Why do cows need concentrates when they get all the good roughage they can eat? The answer is in the cow's capacity. Roughages are so bulky and low in total digestible nutrients (T.D.N.) that a cow can't eat enough hay or silage to maintain herself and give the most milk.

If a cow's ration doesn't supply enough T.D.N., she gives less milk and may draw on her body stores for what milk she does produce. A good dairy cow uses half her T.D.N. for milk production when fed a full ration. On a three-fourths ration she uses one-third for milk and two-thirds to maintain her body. On a half ration, a cow uses none of the T.D.N. for milk.

Michigan, Oregon and West Virginia experimenters believe

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Des Moines, Iowa

that roughage lacks a "lactation factor" that helps boost milk production. When good cows were fed only all the excellent alfalfa hay they would eat, with minerals added, milk production dropped markedly. If grain or protein supplements were added, milk yield came back to normal.

Dairy scientists of the Bureau of Dairy Industry, U.S.D.A., and the University of Maryland believe this lowered yield is due only to a deficiency of T.D.N. in roughages.

As roughages are low in T.D.N., the dairyman has all the more reason to feed them liberally. The dairy cow has the capacity to turn low quality roughage into milk efficiently, with the aid of concentrates. The idea, then, is to feed your cow as many total digestible nutrients as possible in the form of roughage, and make up the remainder of her needs with concentrates.

Your problem is this: How many pounds of grain should be added to roughage to produce milk worth more than the cost of the extra grain?

The answer varies according to your local situation. But you need to consider these four things in determining the best combination of roughages and concentrates to feed: (1) productive capacity of the cow; (2) kind and quality of roughage fed; (3) relative costs of roughage and concentrates, and (4) the price of milk.

First, let's look at the productivity of cows and concentrates needed. Records on some 30,000 dairy improvement association cows show that net return over the cost of extra feed increased as the productivity of cows increased. The higher the producer, the more efficiently she turned feed into milk.

Dairymen who don't weigh milk produced or the feed going into cows, tend to overfeed poor cows and underfeed the good ones. This is true because high producers make milk of feed not used in maintenance. The less productive dairy cows are unable to produce above their inherited capacity.

Cows of good milk producing ability will make good records on roughage alone, but their output will increase greatly when grain is added to the ration.

In an experiment at the West Tennessee Experiment Station, cows produced 8,034 pounds of four per cent milk when fed only good roughage and no grain. But when grain was added, production jumped to 10,579 pounds of four per cent milk.

Experiments by the U.S.D.A. and by other experiment stations show that cows weighing about 1,000 pounds and giving about 9,000 pounds of four per cent milk gave 1.3 pounds more milk for the first pound of concentrate

added to the ration. The cows also ate about .8 pound less hay per day.

Successive additions of concentrates resulted in smaller increases in milk. When six pounds of concentrates were added, cows gave only .8 pound more milk and required .8 pound less hay.

Other experiments by the U.S.D.A. and state colleges show that removing the grain from rations of good cows reduces production by about 25 per cent.

Table 1 gives the amounts of grain to be fed profitably to cows not on pasture. Less grain than indicated should be fed if corn silage rich in mature ears is included. This table can be used as a guide, but changes will be needed to fit your local situation. Table 2 shows the amount to feed cows on pasture.

A second item to consider in combining roughages and concentrates for the most milk is the kind and quality of roughage fed.

If you feed ample protein rich alfalfa, soybean or cowpea hay, or have cows on good legume pasture, only farm grains are needed for efficient milk production. When you turn your cows on young pasture grass — which usually contains about 16 per cent protein—little grain is needed in the ration. But later in the season, as plants mature and drop in protein, grains and protein supplements should be increased.

If poor quality hay or pasture is fed, both the quantity and quality of concentrate should be increased. Grains and supplements should be combined to make about a 20 per cent protein concentrate.

With good, first crop alfalfa hay, cheap proteins such as corn gluten meal or feed may be most efficient. You can substitute these inferior proteins when good quality hay is fed.

If low quality forage or silage is fed, concentrates such as soybean, linseed or cottonseed meal should be used. Otherwise, cows will not be able to utilize their feed efficiently.

A third item to consider in determining how much concentrate to feed is the relative cost of roughage and concentrates. If grains are high, you may be ahead to cut down on them and increase good quality roughage in the ration. If grains are relatively cheap, you probably can boost production and profit by increasing this ingredient.

The final answer as to how much concentrate you can afford to substitute for roughage depends on the supply and price of these feeds.

A fourth factor for you to consider in feeding grain and roughage is the price you receive for milk. If milk prices are high in your area, you will be wise to feed more concentrates. If milk

Table 1: Grain Feeding Table, Cows Not on Pasture

Hay equivalent consumed per 100 pounds of live weight daily			Percentage of fat in milk						
2½ pounds. Very liberal feeding of good roughage	2 pounds. Usual rate of feeding good hay or good hay and silage	1½ pounds. Feeding scanty amount of good roughage or feeding poor roughage	3.0	3.5	4.0	4.5	5.0	5.5	6.0
Milk produced daily, lbs.			Total pounds of grain or concentrates to feed						
Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
27	20	13	3.7	4.4	5.0	6.5	7.2	8.4	9.1
29	22	15	4.5	5.2	5.9	7.5	8.2	9.5	10.2
31	24	17	5.2	6.0	6.8	8.4	9.2	10.5	11.3
33	26	19	6.0	6.8	7.6	9.3	10.2	11.6	12.5
35	28	21	6.7	7.6	8.5	10.3	11.2	12.7	13.6
37	30	23	7.4	8.4	9.3	11.2	12.2	13.7	14.7
39	32	25	8.2	9.2	10.2	12.1	13.2	14.8	15.8
41	34	27	8.9	10.0	11.1	13.1	14.2	15.8	17.0
43	36	29	9.6	10.8	11.9	14.0	15.1	16.9	18.1
45	38	31	10.4	11.6	12.8	14.9	16.1	18.0	19.2
47	40	33	11.1	12.4	13.7	15.9	17.1	19.0	20.3
49	42	35	11.8	13.2	14.5	16.8	18.1	20.1	21.5
51	44	37	12.6	14.0	15.4	17.7	19.1	21.1	22.6
53	46	39	13.3	14.8	16.3	18.7	20.1	22.2	23.7
55	48	41	14.1	15.6	17.1	19.6	21.1	23.3	
57	50	43	14.8	16.4	18.0	20.5	22.1		
59	52	45	15.5	17.2	18.9	21.4	23.1		
61	54	47	16.3	18.0	19.7	22.4			
63	56	49	17.0	18.8	20.6	23.3			

Example: A cow being fed 2½ pounds of hay per 100 pounds of live weight and producing 27 pounds of milk testing 3.0%, should be fed 3.7 pounds of grain.

prices are lower than normal, adding another pound of grain or concentrate to the cow's feed may cost more than the increase in milk will bring in.

For example, let's assume that four per cent milk is selling for $5.50 at the farm. And let's say concentrates are $4.50 per hundred and hay is worth $30 a ton. Then, taking figures given in a previous experiment, we can tell if adding another few pounds of grain is profitable with milk at $5.50.

Table 2: Grain Feeding Table, Cows on Pasture

Quality of pasture			Percentage of fat in milk						
Excl'nt	Good	Fair	3.0	3.5	4.0	4.5	5.0	5.5	6.0
Milk produced daily			Total pounds of grain or concentrates to feed						
Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
32	23	14	2.3	2.8	3.3	4.7	5.2	6.3	6.8
34	25	16	3.0	3.6	4.2	5.6	6.2	7.4	8.0
36	27	18	3.7	4.4	5.0	6.5	7.2	8.4	9.1
38	29	20	4.5	5.2	5.9	7.5	8.2	9.5	10.2
40	31	22	5.2	6.0	6.8	8.4	9.2	10.5	11.3
42	33	24	6.0	6.8	7.6	9.3	10.2	11.6	12.5
44	35	26	6.7	7.6	8.5	10.3	11.2	12.7	13.6
46	37	28	7.4	8.4	9.3	11.2	12.2	13.7	14.7
48	39	30	8.2	9.2	10.2	12.1	13.2	14.8	15.8
50	41	32	8.9	10.0	11.1	13.1	14.2	15.8	17.0
52	43	34	9.6	10.8	11.9	14.0	15.1	16.9	18.1
54	45	36	10.4	11.6	12.8	14.9	16.1	18.0	19.2
56	47	38	11.1	12.4	13.7	15.9	17.1	19.0	20.3
58	49	40	11.8	13.2	14.5	16.8	18.1	20.1	21.5
60	51	42	12.6	14.0	15.4	17.7	19.1	21.1	22.6
62	53	44	13.3	14.8	16.3	18.7	20.1	22.2	23.7
64	55	46	14.1	15.6	17.1	19.6	21.1	23.3	
66	57	48	14.8	16.4	18.0	20.5	22.1		
68	59	50	15.5	17.2	18.9	21.4			
70	61	52	16.3	18.0	19.7	22.4			

If six pounds of grain are added to a roughage diet for cows, each pound of grain results in .8 pound more milk and requires .8 pound less hay. In this experiment, then, the cost of the extra grain is 4.5 cents, and the return is 4.4 cents' worth of milk and 1.2 cents' worth of hay saved. For each 100 pounds of grain added, the farmer made $1.10 net profit.

If the extra milk produced and hay saved would only equal the cost of the extra grain fed, then the dairyman wouldn't even be breaking even after figuring his labor cost. Adding extra grain would be unprofitable, unless the dairyman was attempting a production record.

There are two exceptions, however, to feeding both roughages and concentrates for most efficient production. If you can buy *good quality alfalfa* at a bargain price when concentrates are sky high, then you can make more money feeding roughage alone. Or, if you live near a large city, with high priced land and inadequate storage for bulky roughage, you may find it profitable to feed concentrates liberally.

The smart dairy farmer today asks himself these questions: "Am I feeding high producers enough

or poor producers too much concentrate feeds? How do the prices of roughages and concentrates compare? Am I taking into consideration the quality of my roughages? Is the price of milk high enough for me to make more money by feeding more concentrates?"

Answering those questions is pretty much an individual farmer's job. This article is a guide to help you find the answers. A little time spent working out the answers will mean more profit.

Experiments Prove Value of Antibiotics for Calves

Recent trials at Vermont Agricultural Experiment Station again proved the value of adding antibiotics to the rations of dairy calves up to 12 weeks of age.

Tests were conducted with 18 calves of four breeds—Holstein, Ayrshire, Guernsey and Jersey. The calves were fed whole milk from birth to four weeks of age; they were then given skim milk, calf starter and good quality hay up to 12 weeks. Half of the calves were given small amounts of the antibiotic, terramycin, along with their ration. The other calves, the controls, were fed the same ration without the supplement. Terramycin was added to the ration at the rate of 30 milligrams per hundred pounds of calf each day.

At the end of the test period, the antibiotic-fed calves averaged 15 pounds more than the control calves. The researchers noted that the calves receiving the antibiotic had a better appetite and started eating their grain earlier. They also showed a better "bloom."

In a second experiment, the experiment station compared the effects of the terramycin supplement with older calves, ranging between six and nine weeks of age. The older calves, fed the antibiotic, averaged a daily gain of 1.84 pounds over the eight weeks test period, while the controls gained 1.78 pounds a day—confirming the researchers' opinion that there's little advantage in feeding antibiotics to calves after they have started eating hay and grain.

Field tests in private herds in the state have shown that antibiotic-fed calves have less trouble from scours and digestive disturbances. Scientists are at a loss in explaining how antibiotics influence growth of calves. But they believe that the supplement checks the growth of unfavorable bacteria in the digestive tract, allowing animals to use their feed more efficiently. However, the antibiotic has no nutrient value.

University of Vermont

Grass Pays Him $200 an Acre

Good roughage, a mow dryer and conservation practices helped these 89 acres make $18,000 in 1952 . . .

Condensed from Capper's Farmer

EMERY KAHL had to hustle to grow enough pasture and hay for 21 milk cows and two heifers the first year he was on the place he operates in Dane county, Wisconsin.

Last year he made the farm return close to $18,000 in income. That's about $200 for each of the 89 acres that can be used for feed production.

The big change is the result of fitting the farm for the purpose to which it is best adapted — roughage production. He got the improvement program under way four years ago. The job he did was so outstanding that it won him top honors in Wisconsin's state-wide grassland farming contest for 1952.

The Kahl herd averaged 450 pounds of fat a cow for the last testing year completed. Milk checks topped $1,000 in every month but one. All the roughage fed and all but about $500 worth of the concentrates were grown on the roughly rolling farm, which totals 128 acres when building sites and ungrazed woodland are counted in.

Kahl now milks 31 Holsteins. That's all his barn will hold. Coming on are 14 yearling heifers and six calves. And there's no feed problem. He started the barn feeding season with two full silos. The mow was cramped with more hay than it ever held before. Three thousand bales were bright green leafy grass-legume mixture. The balance was early cut brome and alfalfa cured with a new mow drier.

There should be a carryover of about 1,500 bales of hay and 50 tons of silage. Such a feed reserve will insure against shortage if 1953 turns out a dry year.

When the herd went into the barn for the winter, Kahl had 1,100 bushels of oats and 1,000

Reprinted by permission from Capper's Farmer
Topeka, Kansas

bushels of corn on hand. The whole supply, except one truckload of oats, was grown on the farm.

Kahl has been feeding his best producers a pound of grain mixture for each four pounds of milk they give. The others are fed at one to five rate.

This year mow cured hay and more grass silage will cut grain needs. His aim for the future is to give the heavier milkers a pound of grain for each six pounds of milk produced, the others a pound for each eight of milk. That will require about 535 bushels of corn and 935 bushels of oats if production per cow remains at last year's level.

Kahl formerly fed a mixture of 1,000 pounds of corn, 1,000 of oats, 200 of linseed meal, 300 of bran and 100 of malt sprouts. The cost of supplement for each ton of grain was $24.95. Now, with high quality hay and silage, he adds only 100 pounds of linseed meal and 100 of bran—total value $8.65. So his saving is $16.30 for each ton of grain he feeds.

And he's using only two-thirds as much concentrate a cow. If he had stuck to the old feeding regime, he would be using $8.41 worth of grain mix daily. Better roughage has cut that to $5.27 a day, a daily saving of $3.14, or $94.20 a month.

The land, owned by a brother, Russell Kahl, is steeply rolling. Many operators would have given it up to go look for a better farm. On a sunny October afternoon soon after he was named top man in his county contest, he and a visitor watched his black and white herd strung out along a strip cropped slope beyond a paved road that cuts through the farm.

He called attention to a narrow band on the steepest part of the hillside. Not long before he had cut the corn off it for the silo. Other men who farm in the neighborhood had estimated it would yield 100 bushels of grain an acre.

"When I came here 10 years ago, that strip was too poor to grow good grass," he said. "It was cut by gullies and covered with rocks. I filled the ditches and let it stand in grass several years. What it produced was mowed and left on the ground. Summer manure was spread there to help bring it back.

"Another 14 acre tract also was cut by gullies. I plowed them in, fertilized and seeded grass. Nine of 13 big ditches are filled now and the others are tied down with sod. I can strip-crop the field when I need to renew legume stands, but I trip the plow when I cross a low place. There will be no more ditches on the place while I farm it."

All of Kahl's pastures have

been renovated. He follows closely the six year grassland rotation worked out several years ago by H. L. Ahlgren and his co-workers at the Wisconsin station. Under the Ahlgren plan, land is plowed after it has been in grass four years. It goes to corn a year, then is put to oats as nurse crop for a new pasture seeding. That gives opportunity to kill out Kentucky bluegrass which holds down forage yields when it grows in a mixture that contains legumes.

Ahlgren found that land that grew a well fertilized pasture mixture for four years would make more feed units the next two years if put to grain. Corn and oats provide a way to cash in on the fertility stored by sod crops.

Yield of the hillside corn strip that had gone into the silo was proof of the soil building power of grass, plus a good fertilizer program. Hereafter, however, corn will go to the crib rather than the silo. Reason: Kahl has plenty of grass for pasture, hay and silage. And ensiled grass gives him better production than corn silage.

"When I change from hay silage to corn silage, the herd always goes down in milk," he said. "When I change back to grass ensilage, they go up again, or hold even. That might not be true if corn ensilage that contained 100 bushels of grain were compared with grass silage that was average or poorer. Mine is far above average, for I cut it from a field that is half brome or better, and harvest it before the fiber reaches the stage at which it is poorly utilized."

Hay is made from newer seedings which are high in alfalfa. It is harvested while protein content is high and fiber low. When it is dried down to around 35 per cent moisture it is chopped with a field cutter and goes to the barn where curing is finished with a flue-type drier.

Last summer the herd had four pastures, which were grazed in rotation. These ranged in size from a five acre field that will go to corn in 1953 to a 20 acre tract that includes seven and a half acres of renovated pasture, eight acres of permanent pasture and four and one-half acres of low producing woods pasture.

Forty acres supplied grass for the 49 animals until fall. Then strips that produced hay and silage crops were grazed briefly to get the benefit of aftermath that had grown up after harvest.

A bull is termed proven when the production records of at least five of his unselected daughters have been compared with the production records of their dams.

He Builds Soil to Pay His Debt to America

Men, management, money and machinery build a profitable Texas farm enterprise for a former Turkish immigrant

Condensed from Acco Press

Ben Boddie

MILK, beef, pork and vegetables pour from a trim farm near Mesquite in Dallas County, Texas. A visit there provides an impressive sight. There are 1,300 acres ribboned with terraces, covered with lush green fields of clover, vetch and grain sorghums, dotted with 24 tanks and beautified with about 2,000 fruit and budded pecan trees.

It's hard to imagine that the man responsible for building the farm walked ashore in New York in 1906 not knowing a word of English with 75 cents in his pocket. He is Faithon P. Lucas, a Dallas cafe owner. After arriving in New York, Lucas worked hard at various jobs and saved his money. Then he came to Dallas and bought an interest in the cafe he now owns. Life was good to him. He prospered and looked around to see what he could do for America, the land that had done so much for him.

Lucas remembered that in Smyrna, Turkey, his family had managed to gain a living out of three rocky, hillside acres that had been farmed for hundreds of years. He looked around and saw topsoil, the source of all life, washing away. "Then I decided to rebuild some land as a contribution to America from me," he said.

After many trips to the surrounding countryside he found a rolling 35 acre tract of land that was as worthless as the county possessed. The topsoil had washed away and spots of yellow clay were visible all over the wilderness of weeds in the deserted fields. That was in 1928.

Soon the grateful immigrant was the proud owner of the 35 acres. He kept adding to his hold-

Reprinted by permission from Acco Press
Houston, Texas

ing until he had 200 acres of apparently worthless land. Neighboring farmers chuckled. "He's going to lose his pants," they told each other.

But Lucas knew what his ultimate purpose was. He intended to rebuild the land as soon as possible. First he planned to build terraces of rock and farm as his family had done for hundreds of years in Turkey. Then he found out, to his surprise, that Dallas county agent A. B. Jolly was actually hired to help people build up their land.

The two men carefully studied the fields of weeds and then, as carefully, laid out terrace lines. Lucas hired county machines to do the work of smoothing the land, chopping up the gullies to stop the washing away. Neighbors were surprised when they saw terraces being built and more ditches being dug. But they admired Lucas' determination.

Many loads of manure were spread over the poor soil. Lucas even offered to clean out the neighbors' barns if they would give him the manure. Some gratefully accepted the offer of free cleanings for their barns.

With as much determination as ever, Lucas kept working hard at his task. He planted sweet clover to build the soil, and fruit trees and berries on the terraces. He kept planting and sowing and adding hogs, chickens and cattle to his farm.

After a few years he got a tenant, a cotton farmer. Lucas didn't care much for the crop but decided that he would give it a try.

The land produced a half bale to the acre. However, Johnson grass came up faster than the cotton. But Lucas knew exactly what to do to solve the problem. He bought a big flock of geese and they went honking up and down the rows of cotton and soon had the fields cleared of Johnson grass. Then the fattened geese were taken to the cafe and sold over the counter.

Skeptical neighbors figured the cafe couldn't go on supporting the farm forever. In spite of this, they noted that Lucas continued to add land until he held a total of 1,300 acres.

Lucas put his four M's into operation — management, men, money and machinery. Finally, in 1936, the farm broke even.

Dallas county agent Jolley, who has been in the business for 30 years, said that the Lucas farm was the most outstanding soil building job he had ever seen.

Last year Lucas added a full size meat packaging and processing plant to the farm. Four master butchers work on the federally inspected meats. Incidentally, beef cattle are born on the farm and carried along all stages to the final 90-120 days in one of the farm's feed lots. Most of the

choice meat goes to the cafe, one of Dallas' busiest, but anyone can drop by and pick up a whole beef, a half beef, or a quarter beef cut up in any specified manner for a deep freeze. Selling the beef at wholesale prices brings a lot of business and good will.

The dairy herd of 135 cattle, mostly Guernseys, is the apple of Mr. Lucas' eye. C. A. Bolding, herdsman, knows every one of the cattle by name and says, "It's not a show herd, but just a herd of good cattle with their working clothes on."

The farm has a clean 20 cow milk barn and its own pasteurizing and bottling plant. Each day almost 200 gallons of fresh pastuerized milk are shipped to the cafe. Surplus milk is sold to a commercial dairy in Dallas.

A native of Minnesota, E. B. Knudsen, takes care of the farm's flock of 3,500 white leghorns that produce about 80 dozen fresh eggs each day. All of the fresh eggs are used in the cafe and Knudsen says that they hope to increase production to 125 dozen eggs a day. The hens are kept in seven large houses according to age groups and are fed all they can eat.

Lucas has raised a fine family of three boys and four girls. Knowing that he needed to keep up with the times even though he had native know-how, Lucas sent his son, George, to Texas A & M College. George now manages the farm.

With everything on the farm running smoothly, Lucas said that he was turning back to his first love—soil building. He now plans to let the Soil Service build a 270 acre lake on his lands as a part of a plan to harness the east fork of the Trinity river.

Corn Acres Down, Yields Up

In a recent review of the feed situation, USDA economists trace the trend in corn production over the past 20 years. They point out that the acreage farmers planted in corn this past year was about a fourth less than the record corn acreage reached in the early thirties. On the other hand, production has trended upward as more and more use of hybrid seed and other advances in production methods, such as expanded use of commercial fertilizers, have substantially increased the bushel yield of corn per acre.

The economists report farmers plan a further reduction of nearly a million acres in corn this year. Farmers indicate they plan to seed about the same acreage in barley and to increase acreages of oats and sorghum grains. *University of Nebraska*

Plans for Better Farm Marketing

Farmers may get a lift from this new Federal-State co-operation . . .

Condensed from Marketing Activities

Leighton G. Foster

SINCE 1948, a co-operative federal-state program aimed at improving the marketing of farm products has been in operation in 32 states and three United States territories. This program, authorized under the Agricultural Marketing Act of 1946, has three broad objectives: To provide basic state and local agricultural data and market information, to improve marketing methods, and to provide technical assistance to marketing agencies. Marketing service projects under the program are financed on a matched fund basis by the U.S.D.A. and state departments of agriculture or other state marketing service agencies.

Notable among accomplishments under the program have been: (1) a survey in Wisconsin of livestock by types, market movement, seasonal peaks, and other factors, which was used as a basis for development of much needed livestock concentration yards by farm organizations and co-operatives there; (2) a program in North Carolina for improvement of cotton ginning, which increased the quality of the commodity by reducing "rough preparation" and boosted the annual value of the state's crop by well over a half million dollars annually; and (3) a project in Indiana to develop improved and uniform methods of grading milk and cream which cut the amount of rejected milk in that state by over one-half million pounds in one year. Another project in North Carolina, based on development of basic production data and technical assistance, brought about more efficient grain storage, drying and turning facilities, which are estimated to have increased producers' prices on 20 million bushels of cash corn by about 25 cents a bushel.

In planning this marketing

Reprinted from Marketing Activities
Washington, D. C.

service program, the Production and Marketing Administration (USDA), has arranged workshop conferences bringing together representatives of the participating states and territories, representatives of the various segments of the food distribution industry, and interested USDA personnel. Two of these workshops were held in December, 1952, in St. Louis, Missouri, and Baltimore, Maryland. Representatives of 25 states and two territories participated in the meetings.

The over-all purpose of the workshops was to identify and evaluate specific problems in marketing where it was felt that marketing service work was required, and then to determine just what specific programs state departments of agriculture should be prepared to undertake to solve or alleviate these problems.

Those attending the workshops were divided into three work groups of 8 to 15 members. Each group developed information, based on the knowledge and experience of its individual members, on marketing problems of specific agricultural products, made recommendations for their solution, and made a written report of their discussions and conclusions to a general session of the meeting. There the reports were further considered by the entire group.

The work groups, which at both of the meetings covered the three phases of marketing service provided for under the program, were set up as follows:

GROUP I — Covered problems related to the need for, collection, interpretation and use of basic crop, livestock and market data. For example, more statistics are needed on the volume of livestock marketed "directly," sold through auction markets, or shipped to market by motor truck. It was brought out at the meetings that the emphasis should be confined to areas for which NO basic information is now available.

GROUP II — Covered specific problems related to operating efficiency of marketing agencies. Such questions as these were considered: Do marketing organizations constructing new facilities have access to research findings on proper size, type, location and layout of such facilities, and, if not, what should state marketing service agencies do about it?

GROUP III — Covered specific problems related to maintenance of product quality and efficient marketing of agricultural products. This group concerned itself with problems revolving around such matters as service work needed in maintaining quality of products in market channels; whether shippers, packers or others are attempting to market a grade and pack that is not desired in certain markets; and whether grades and

standards are helping to bring about more efficient marketing.

Workshop Reports Studied

The written reports of the workshop groups, after discussion and recommendations by the general session of the meetings, were further considered by an advisory committee. This group is composed of representatives of state departments of agriculture and bureaus of markets. It made a further study of the recommendations of both the St. Louis and Baltimore workshops and grouped them by commodities.

In this form, together with a general report, the recommendations have been, or will be, passed on to the Commodity Advisory Committees which are appointed under the Agricultural Marketing Act as advisors on research, service and education programs authorized under that law. There are 17 of these committees, composed of representatives of federal and state agencies, producers, farm organizations and private industry.

Because of space limitations, it is not possible to list the recommendations made to all of the Commodity Advisory Committees. Several illustrative recommendations are paraphrased below:

Vegetables

Tomatoes: Show growers the stage of ripeness at which they should pick "green wrap" tomatoes and encourage them to harvest at that stage. Encourage the use of shipping containers for tomatoes which give maximum protection at most reasonable cost. Show growers packing methods which will reduce bruising and other injury.

Sweetpotatoes: Show growers how to handle their crops in a way to reduce bruising, cutting and skinning. Encourage adequate storage facilities where they are needed and not now available. Assist shippers to modify their sorting, packing and handling practices so as to reduce bruising and to enable them to pack to official grades. Also assist them to find new markets by locating those areas lacking supplies and those with most favorable prices.

Sweet corn: Show producers and shippers how to precool and/or ice sweet corn and the advantages of this method of handling. Work with wholesalers and retailers to encourage them to keep the product under refrigeration. Encourage consumers to buy sweet corn on a quality basis and take care of it in the home. This work would be done in co-operation with the extension service.

Vegetable canning crops: Provide programs meeting the needs of some packers for assistance in developing quality control. Encourage packers to sell according to official standards and grades. Show small packers the advantages of selling under a uniform

label, and assist them in achieving more uniform quality and improved operating efficiency. Develop improved methods of financing for the better quality pack which is expected to result from adoption of this program.

Development of concentration markets: Make surveys to determine the kinds of markets, and where they should be located, which are needed to effectively handle the increasing volume of agricultural products which are being moved by trucks. Encourage the establishment of these markets where they are found to be necessary. (Such markets, naturally, would also handle other commodities than vegetables and similar recommendations were made in other commodity reports.)

Improvement in marketing in large consuming centers: Many wholesale markets in eastern metropolitan areas are outmoded and a lot of chain stores and independent retailer groups have turned to direct buying from consumers, it was pointed out. This trend is increasing. Therefore, where it is possible, assist in the modernization of such terminal markets. Where it is not possible or desirable, and such direct buying is advantageous, co-operate with extension service, farm organizations, producers and marketing agencies in developing programs to assist this type of marketing. Co-operate with the same groups to develop merchandising programs for seasonal surpluses of perishable commodities and develop a continuing consumer information program in the interest of both consumers and producers. Co-operate with the extension service and appropriate market news services of PMA to evaluate the possibilities of establishing information on the amount of produce unloaded and prices at various markets which would serve as guides to truckers in determining the destination of their cargoes. (Similar recommendations were made in the report to the advisory committee for fruits.)

Poultry

Market information: Estimate production of broilers by county or local areas to provide information which would show whether or not there is need for auction or other types of markets or for the construction of processing facilities. Provide information on turkey poult placements for all commercial production areas which would give the number of Beltsville and other types of turkeys that might be expected to be available for marketing. Provide for estimates of county or local area egg production as a guide for locating egg grading stations. Develop experimental local or area market news service for poultry and eggs where not now available.

Technical assistance to poultry processing plants: Among the problems listed under this phase of the report were how various scalding methods affect the length of time poultry will remain marketable ("case-life"); the different terminology used in describing various market classifications of poultry; the lack of processing efficiency; lack of storage; the need for using proper packaging materials for poultry and the need for better methods in retail merchandising of the product. To meet these problems the report recommended the development of a marketing service program to acquaint the trade with, and encourage the use of, improved merchandising practices. This would include: Work with processors in adopting scalding methods and cooling temperatures which would result in better quality maintenance for poultry throughout marketing channels; the adoption of uniform terminology for ready to cook, dressed and live poultry by processors, distributors and retailers; use of improved dressing and eviscerating methods; adoption of better storage practices, including use of proper temperature and humidity to better preserve quality; the adoption of packages best suited to marketing poultry in its various forms and to improve physical facilities, sanitary measures and operation techniques of processors. It also was recommended that existing programs for training retailers in modern methods of poultry merchandising, provided through co-operation of the Poultry and Egg National Board, be extended.

Programs with wholesalers and retailers of eggs: Encourage marketing of eggs on a graded basis and assist individuals of firms in setting up grading stations where they are warranted. Institute programs looking to better maintenance of egg quality through improved handling, storage preparation and display. Develop better consumer understanding of the quality of the several grades of eggs through co-operation with the extension service.

Milk production increased sharply in the second half of 1952, and February milk production was five per cent over a year earlier. This was due to three per cent larger cow numbers, better feeding, and to mild fall and winter weather. Most of the increased milk production is being bought by the government in the form of butter, cheese and dry skim milk. For the first week of March approximately 34 per cent of the butter production and 49 per cent of the cheese production were purchased under the support program.

Now, It's Farms for Factories

300 Herefords graze this plant's front lawn . . .

Condensed from Nation's Business

Anna M. Coit

TYPICAL canebrake, woods and cotton terraces line the highway east from the old farming town of Pendleton, South Carolina, and then the view opens on a scene that could be Montana —cattle grazing on a wide sweep of grass. Such sights have become common in the south, but in this case, instead of a farmhouse there is a long, cream colored building. This is Deering, Milliken & Co.'s mill where they weave orlon and nylon and raise whiteface cattle.

Both mill and cattle are there for profit. Both are also assets to the neighborhood, one through jobs, the other in demonstrating how to change from backbreaking row crops to beef. It is an attempt by industry to put the land about its property into profitable use, in this case cattle raising.

The Milliken building, like the seven other plants the company has built since 1940, has two kinds of air conditioning, one for thread, the other for people. Almost windowless, the tile-brick facade structure is unspoiled by power line, coal heap or parking lot, all of which are out of sight.

But t h e r e is nothing fancy about the cattle in the surrounding meadow. Of the 300 animals in the growing herd, all but the few bulls are grades, and the bulls are of two breeds. Four men with a pickup truck and a tractor take care of the project.

Roger Milliken, the company's 37 year old president, wants just one thing to come from this dual mill and cattle operation—profit. He also has started two other mill farms with a total acreage for the three of about 2,000. The fact that the cattle are grades brings no blush to his cheek if they will make money.

The chief expert on profits is Edward Whitson Simpson, jr., an energetic wartime navy pilot who came in '48 to landscape the place and stayed. According to Mr. Simpson, the company should be able to handle one head of beef per acre of grass with an annual profit of perhaps $100 a head. This is a 10 to 15 per cent return

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Washington, D. C.

on the investment. And that, to use the vernacular, isn't hay, which commodity, by the way, is frowned on by exponents of the new 365 day grazing methods of southern beef culture.

Even so, why does a conservative old firm like Deering, Milliken bother? As producer of more than 600 million yards of goods a year, what does the company want with cows?

The answer is in the firm's conservatism. A Milliken mill is built as a permanent part of the community (one has been going for 87 years), not with the idea of taking a quick profit and pulling out. The company likes well built plants with pleasant surroundings and local good will. It prefers to locate in the country. That is where the cows come in.

"There's a real advantage," Mr. Milliken says, "to having our workers live on farms because it means that they have the added security of a piece of land."

To keep speculators from creating temporary villages near the mills, the firm buys large sites and, as an added precaution, carefully checks each location. The Gerrish-Milliken mill, for instance, is next to a golf course; the Excelsior finishing plant nearby adjoins Clemson Agricultural college's 40,000 acre game preserve.

On such sites, cattle are an obvious choice. They clip the grass and cultivate good will.

Ensconced in farms that way, the mills come as close to not being there as a mill can get. The Gerrish-Milliken mill, all clack and bustle inside, looks like a quiet park from the outside. There is no sign on the main road to tell anyone what it is. The finishing plant is on a back road. It is so little publicized that a man can drive around Pendleton for an hour without finding it. The sign on the farm pickup truck is just about the largest company sign in town.

* * *

While it isn't practical to go barefoot while driving hogs, that practice would eliminate most of the bruises on the hams of hogs. A national survey discloses that nearly half of the bruising in hogs occurs on the ham. It also indicates that nearly two-thirds of the bruises were caused by canes, whips, clubs, kicking or prodding.

* * *

Milliken executives find more entertainment in the farms than they would in landscaped lawns. The view is quiet, restful. The farms are something to show visiting businessmen.

The initial cost of the farms was not high. The cows were bought as heifers at local auctions and in the west. For an idea on land preparation, take the newest farm, the one at the Gayley Mill

in Marietta some 30 miles to the north. The mill and its 1,000 acres cost four million dollars, of which the tentative budget for landscaping the first 300 acres was $30,000. Actual expenditure per acre has run about $62, the state average.

The New York office which does all cattle accounting has become as particular about tracking down a steer as about tracing a bolt of cloth.

Meanwhile, the cattle project is on the plus side in human relations. Government agencies helped with advice, but the main credit goes to private industry moving into the rural areas of its own accord and using some profit prompted ingenuity.

"We felt we could make a contribution to the community," says Mr. Milliken. But it is a contribution to warm the cockles of a stockholder's heart.

Social Security Aids Farm Workers, Employers

Half a million United States farm workers have had social security protection since regular full time farm work began to count toward social security benefits two years ago.

Any farm laborer doing regular, full time farm work, is required by law to have one and a half per cent of his wages deducted, and the employer is required to pay a like amount, making a total of three per cent, to be turned into the director of internal revenue for social security benefits to the farm worker.

If the farm work doesn't meet the requirements as a regular, full time job month after month with the same employer, then it doesn't count toward social security even if the worker would like to join up.

The amount of a family's payments under social security depends on how much they have each month in cash wages and how many dependents can qualify for payments. For instance, a 69 year old farm worker, who had worked on farms all his life, was making $200 a month in cash wages, but decided to ease up a little and change to part time work. After checking with the social security office, he found that he would receive $70 a month, and his wife, who is 66 years old, will get another $35 a month, making a total of $105 a month in social security payments for both of them.

Any social security office can give information concerning eligibility of farm workers for social security benefits. The address of the local office can be obtained from any post office.

Farm and Ranch News

A Lesson in "COW EFFICIENCY"

Heads, necks and shoulders tell an important story . . . if you know how to read them.

Condensed from Holstein-Friesian World

Roland Ramsey

AT THE time of conception, the upper limits of every calf is settled—that is—the dairy inheritance, the udder, test, size, type and color are "fixed" in the animal and nothing that man can do can change the intrinsic values bred into the animal.

Lack of proper feed, care and management often impair the usefulness of our animals and cause them to fall far short of developing into the animal nature had planned. But in most cases, the transmitting qualities are still present and will be passed on to her sons and daughters.

The success of all breeders of dairy cattle depends upon the ability of the breeder to discover true dairy inheritance and mate his animals intelligently.

We have all been taught that testing for production is the way to discover the dairy inheritance and ability of an animal, with the insinuation, that the larger the record the greater the cow. This would be true if ALL cows were tested under exactly the same conditions and environment. We all know that environment is practically NEVER the same from one year to the next even in the same herd. We know that a cow that made 350 pounds fat in a neighbor's herd might make 500 pounds in our own herd and a very much larger record if in still another herd where she was milked three or four times a day and force-fed to the very limit.

Records are one of our most valuable tools but they are useless and even dangerous unless we realize that all records are simply the results of the dairy inheritance of the cow and the environment

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Lacona, New York

she was tested under — nothing more or less.

With the "stakes" so high for "proven bulls" and high record cows and with the largeness of the record so easily and greatly influenced by environment, it is sometimes very difficult to properly estimate the "true dairy inheritance" of a cow by the size of her record even if every detail of the environment could be learned. It is quite obvious that a successful breeder must not only learn to interpret records but he must also be able to understand some dairy inheritance by studying the cow herself.

In studying the head, neck and shoulders of a cow in search of possible clues as to her dairy inheritance one should NEVER lose sight of the fact that cows do not give milk with their heads, necks and shoulders — they give milk with their udders and unless a cow has at least a fairly well attached "utility" udder one should not be even interested in further study. The author fully agrees with the sentiment so often expressed concerning the importance of good udders and the sayings — "no udder — no cow" and "a cow is no better than her udder" are all very true as far as they go but the implications are that a cow is always as good as her udder which is often not true. A few years ago we had a V.G. cow in our herd (very seriously considered for E) that could do no better than 350 pounds fat under exactly the same environment that other V.G. cows of similar size, udder and body capacity were making 500 to 600 pounds on.

The best classroom in the world in which to study heads, necks and shoulders is your own barns and pastures — the best teachers are your own cattle. You know the background of each cow and her production from the time she first freshened until the present time. So, armed with these facts, you are in a position to study the heads, necks and shoulders of your various cows for possible clues nature has to offer as to why certain cows do or do not "click."

The best place to start your study of heads, necks and shoulders is on your highest producing cows—starting with the tip of her nose and working back. Notice that she has a "long hungry head," a good broad muzzle, bright, clear eyes, alert ears, a long, lean neck and a sharp shoulder. Those are, briefly, the characteristics of the "milk wagon" type of cow. While she is a heavy producer she has her faults in that she is always hungry, always reaching through fences for choice bits of grass or eating the leaves off the trees in the pasture to an unbelievable height. Every thing she eats goes to milk. Because her shoulders are so sharp,

she is quite likely to be narrow between the front legs and weak in the heart and because of this lack of ample room for her lungs and heart she is quite likely to be irregular in breeding and, well, more or less just run out of gasoline about the age we like to consider a cow mature.

After you have studied your highest producing cows awhile, go directly to those good, big V.G. and Good Plus cows that for some reason or other just never produced as much as their looks would indicate. If one of them has a long head it will probably be narrow—if the head is of medium length you will, no doubt, find a rather narrow muzzle and sort of a "muggy" nose. Notice how much less prominent and expressive the eyes are as compared to your high producing cows—how much less alertness there is to the way they handle their ears—notice the lack of that clean cut dairy neck and the type of the shoulders. Isn't it plain to see why they are relatively low producers?

Now hunt up "old Bess," your pride and joy cow. Old Bess is the cow you describe as being V.G. every day of the year—her production is well over the average of the herd each year—she is a regular breeder and, well, "If I could just breed a whole herd like her I would be satisfied."

Now let's take a good look at the head, neck and shoulders on "old Bess." Her head is of medium length, her muzzle is wide, her jaw strong and her nostrils extended and large. There is no "mugginess" about her nose, instead it is beautifully chiseled out with veining showing on the sides. The eyes are large, bright and expressive and the ears alert. The neck, of medium length, is clean and dairylike and the shoulders are a complete study in themselves — not the extreme sharp shoulders of the "milk wagon" type or the loose open kind so often found on the low producer. They are rather of the neat, medium type with the back bone vertebrae showing well above the shoulder blades. There is a complete fullness and smoothness back of the shoulders, a wide deep heart and unusual width between the front legs. If you can remember her as a calf you will recall that at from two to four months of age she was unusually bright and attractive and as the heads, necks and shoulders of our animals are the first parts to establish themselves she had essentially the same type head, neck and shoulder then that she now has as a 10 or 12 year old cow.

As an older calf and yearling she went through a stretchy, rather gangly stage — a little too strong in the back, a little too low in the pins and a little too much "day light" under her to win at a show. As a first calf heifer her

production was about average for the 2 year olds in your herd and she was classified Good Plus. V.G. in "dairy character" "mammary" and "feet and legs." Good Plus on rump and Good on "body capacity."

As a 4 year old her production was well above the average for your herd—she had bodied down and leveled up to the point where she was easily classified V.G. and by the time she fully matured at about 8 years of age she had developed into the big, stout, heavy producing and regular breeding cow we are all so anxious to be able to breed.

While there is an "old Bess" in practically every herd such as your's and mine the tragic part of it is so often, although she may leave a half dozen daughters in the herd, she has never been mated with a bull out of someone else's "old Bess" and therefore was unable to leave a single daughter as good as she.

Practically every breeder and 4-H youngster knows that the "score card" gives the mammary system 30 points and the feet and legs 8 points out of a possible 100 but how few people realize that the score card gives 12 points for the head alone. These 12 points combined with the points allowed for the neck, shoulders, smoothness back of the shoulders, strength of heart and width of the chest all add up to quite a sizeable block of points. In my opinion there is nothing wrong with the "score card" or the True Type cow—the trouble is we, generally speaking, fail to give the head, neck and shoulders the important consideration they deserve.

Take two great show cows battling it out for first place at one of our great dairy shows, both have beautiful, well attached udders, good size, good legs and plenty of body capacity. One is a very great dairy cow and the other has never endangered that beautiful udder of hers by producing too much milk too long. The relatively low producing show cow quite often is given first and later Grand Champion and the official reasons are given about like this—"In making my decision between these two top cows I like the "dairyness" of the second place animal very much, but, because I consider the top place cow has a very slightly superior udder, is very slightly better in the feet and legs and is slightly smoother throughout, I feel justified in placing her over the better headed second place cow."

Perhaps the top cow did have a couple of points advantage in the parts pointed out but wouldn't this advantage quickly have been overcome if the head, neck and shoulders of the two cows had been properly evaluated and scored? It is the occasional All-

American and Grand Champion and V.G. and E animals that are relatively low producers that add fuel to the contention still voiced by some that there is no correlation between "Show Type" and Production.

We can all breed the kind of Holsteins we want if we have the patience and determination. We need more testing, not less—we need to learn to interpret records made in other herds in terms of our own environment—we need to show and classify our cattle and we need to learn the lessons nature is trying to teach us by studying the cow herself.

* * *

The less favorable price situation for agriculture currently is not the result of depressed domestic demand since the change came during a period of high employment and income. High over-all production, reduced exports and the limited dollar exchange along with improved conditions in other countries are cited as major reasons for the drop in farm prices.

* * *

In conclusion and generally speaking, provided, of course, the head and neck show desirable dairy qualities, the usefulness of the cow is quite clearly indicated by the shoulders and the region about the shoulders. The degree of sharpness of the shoulders usually indicates the size of the record. The width between the front legs, the fullness of the heart and smoothness back of the shoulders indicate the length of time the cow is likely to be able to sustain that production and the regularity of her reproduction.

Obviously one can hardly "have his cake and eat it" because it is almost impossible to breed extremely sharp shoulders without sacrificing the room within the shoulders for the strong heart and lungs that mean long life and regular breeding. One should hardly hope to improve on the "True Type" cow, especially, her head, neck and shoulders, if one expects to breed a herd of V.G. and E 100,000 pound cows.

Do not feel unduly handicapped because you may not be financially able to buy a son of the particular sire you consider "tops" from an equally famous dam. No breeder or strain of cattle have a "corner" on greatness. Great cattle are where you find them. The country is full of herds like yours and mine — each with an "old Bess," though going perhaps by the name of Molly, Beauty, Bunny or Mabel. Visit and study a few of these herds and you won't usually have to travel too far before you will find a great cow or group of great cows each with daughters as potentially great as their dams. When you do, you have found the answer to your breeding problems.

New Development in SANITIZING EGG WASHING

How Eddie Lawless and Cliff Walton worked week-ends to learn why "quality" eggs went bad overnight, and how they helped solve the problem

Condensed from Pennsylvania Farmer

D. M. Cresswell

"YOU'RE just plain crazy!" That was the discouraging reaction from poultrymen three years ago when two employes of the Bureau of Markets in the Pennsylvania Department of Agriculture said they had discovered why some "quality" egs went bad almost overnight.

But Eddie Lawless and Cliff Walton took courage from their own convictions and, with the co-operation of a bacteriologist, some detergent - sanitizer manufacturers, NEPPCO officials, and a number of "show me" poultrymen who conducted field tests, they proved their point.

And in proving their point these two men and their co-operators have made one of the most significant contributions in years to a multi-billion-dollar a year industry.

They have made it possible for the industry to prevent heavy losses. They have made it possible for producers and retailers to save themselves from many a "red face" by having angry housewives throw inferior eggs back in their laps.

They have proved that old style or ordinary methods of "washing" eggs caused good eggs to lose quality fast and get to the spoiling stage within three days because careless washing permitted millions of bacteria to get inside the egg and break it down to a worthless mass within a shell.

Story of "Green Eggs"

So this is the story of "green eggs" uncovered by "black light".

Reprinted by permission from Pennsylvania Farmer
Pittsburg, Pennsylvania

(ultra-violet). It really began five years ago and is now brought to a climax in the assurance that proper "sanitizing" methods and materials are available for the cleaning of dirty eggs—and old washing methods are a detriment to the producer, the dealer and the retailer. It is the story of the development of the egg detergent-sanitizer.

In 1948, E. J. Lawless, jr., chief of the poultry and egg division in the Pennsylvania Department of Agriculture's Bureau of Markets, and Clifford D. Walton, his assistant, were faced with piled up evidence that there was an increasing decline in the quality of eggs, as much as 25 per cent, even after routine grade inspections revealed eggs that apparently were of top quality. The team of Lawless and Walton then and there concluded it was their duty to determine the cause of the downward quality change they and many others had noted.

Tracking Down the "Bug"

Fresh egg law inspectors of the division were alerted. They also noted the down trend in quality of eggs examined in retail stores. But they couldn't pin-point the trouble.

Next came a check-back at the grading stations serviced by the Bureau of Markets. These rechecks revealed only that the drop in quality was rapid.

Did the trouble lie in high energy feed? No. Experts on feeding said feeding could affect quality, but feeding alone could not account for the full drop that had been observed.

Was it due to rough handling? Studies revealed an average of 10 per cent loss from breakage with checks in some instances running as high as 25 per cent. But poor quality still showed up in uncracked eggs, and rough handling did not account for nearly all of the quality decline that was evident on all sides.

The problem of poultry diseases was investigated. Loss in quality of eggs from Newcastle and bronchitis can be counted on, but not to the extent that prevailed in the two years spent in running down the cause. It was found that excessive use of abrasives caused some quality loss and that the merchandiser sometimes was at fault through carelessness in lack of dating or coding, and in refrigeration.

In their search for factors affecting egg quality the Lawless-Walton team reports that egg cleaning was the last loophole to attract their attention. But that's where they "hit the jackpot."

One day in 1950 they received a call from an egg dealer who seemed to be alarmed and quite distressed over complaints from consumers. They examined the eggs and went at once to the farm of the producer. For some time

the producer had been washing all dirty eggs. On a hunch, samples of the eggs and wash water were sent to a bacteriologist at Cornell university. At the same time the suspicion was revealed to Dr. Alfred Van Wagenen, director of NEPPCO, Alfred Otte, poultry division of the United States Department of Agriculture, and Dr. Wade Brant, USDA Laboratory at Beltsville, Maryland. All became actively interested.

The bacteriologist's report disclosed that the break down in quality came from a bacterial infection known as Pseudomonas Fluorescens, which workers began calling "the bug." Its discovery brought a definite tie-in with improper egg cleaning. It seemed to be a logical answer to most of the puzzle surrounding the deterioration of egg quality that had started the study two years previously.

Was it a crazy idea? When mathematicians get in a spot like that they say: "Q.E.D." meaning "It must be proved."

Eggs were infected with that unpronounceable "bug." It was present in the ground, in hen houses, in manure. It didn't show up in eggs under ordinary egg candling light, the reason why it hadn't been discovered in grading.

Bugs Are Really Small

But under "black light" it was seen that the bug was everywhere —in the washing water, on the outside of the egg and anywhere from 26,000,000 to 1,350,000,000 per cubic centimeter inside the egg! Bugs so small—25/1000 of an inch long—that 25 of them could swim shoulder to shoulder through any one of the 4,000 to 8,000 very tiny pores in the shell of an average egg. And a regiment of them could go in through any one of the 16 to 20 larger pores which are visible to the eye.

Pores in egg shells normally will not admit micro-organisms because when dry they are filled with an organic material (mucin). But if this organic filler is dissolved by some means or removed by abrasion, the pores are opened. Under black light an infected egg had a greenish color that was not visible under candling light or to the eye when broken open. Infected eggs had an odor in the later stages of infection.

The Lawless-Walton team then began work in earnest. Each had his regular departmental duties to perform, duties so heavy they had little or no time to spare from assignments that took them to all parts of the state. But the challenge to follow through was so great they decided to devote week ends, on their own time without extra pay, to running down the mysteries presented to them under black light.

The Problem—How could bacteria from dirty eggs be kept from getting into the egg when the egg was washed or cleaned?

Frank Ellis III, secretary of NEPPCO and chairman of the Pennsylvania Poultry Federation's egg cleaning committee, had been interested in the project from the start. He offered his Fuzzydele Farm plant at Elverson as a laboratory. Jerry Zich of the New Jersey Department of Agriculture brought interest and assistance from that state.

The industry asked Lawless and Walton to check the performance of a certain egg washing machine. While doing this, one particular cleaner-sanitizer used by dairymen created great interest. Some extra dirty eggs (mud balls) were cleaned on the machine with this compound. The eggs were kept at room temperature for two weeks, then at 50 degrees for three more weeks. No infection could be found with black light.

This led to an all-out experiment for absolute proof because some on the inside of the project were still skeptical. The company supplying the cleaner-sanitizer donated the services of their bacteriologist. Dr. Van Wagenen contributed the benefits of his years of study and vast knowledge of egg quality.

Pedigree eggs were used—18,000 of them—and a quality index was made on every bird before starting the tests. Cleaning methods included the dip, agitation, tank and continuous flow.

Thoroughly Tested

Both acid and alkaline detergents were used, some with varying amounts of sanitizer, some without sanitizer, also plain water. Cleaned eggs were given every test "in the book," chiefly those to which eggs normally are subjected in handling from producer to consumer. Half were kept at room temperature for three days; in refrigerator two days; refrigerator three days and room again three days. The other half went into cold storage, 10 per cent being checked each month for six months, and the balance at the end of that period.

Results: Best performance, alkaline detergent with sanitizer; greatest loss, plain water. Only unwashed eggs and eggs cleaned with an alkaline detergent with sanitizer developed no green eggs. The best detergent-sanitizer was one that had been designed and was widely used in dairy work where bacterial growth must be kept at a minimum. But the cost was a little more than the poultry industry could stand.

So there was more experimentation. The objective was a detergent sanitizer that would clean eggs efficiently, sanitize them correctly, leave no detergent deposits, and carry a margin of safety. Taking part were chemical manufac-

turers, chemical compounders, egg dealers, producers, and the Lawless-Walton team devoting hundreds of hours of their own time to the project. Laboratory and field tests were supplemented with practical tests on six Pennsylvania and six New Jersey poultry farms. Approximately 50 different formulas were tried before a detergent-sanitizer was found to meet all requirements.

Held Good Quality

Finally the point was reached where cleaned eggs were found to hold their quality and kept just as well as nest clean eggs. "Egg washing" now belongs to the dark ages; "egg cleaning" presents a new birth of freedom for the poultry industry — because two state employees felt it was their determined duty to run down a bugaboo and make it possible for poultrymen everywhere to conquer Pseudomonas Fluorescens—The Bug!

Details were unfolded at a rally of poultry industry leaders from Pennsylvania, New Jersey, Delaware and Ohio held in Downingtown, Pennsylvania, this spring, followed by a visit to the Fuzzydele Farm where black light exposed the bug and egg cleaning machines were shown in operation.

Development of satisfactory egg cleaning compounds is not the complete answer and cleaning is not a substitute for good management. Lawless says: "Produce clean eggs. Clean only dirty eggs.

* * *

Varieties of cotton grown in this country have been reduced in the past 25 years from 600 to 30 improved types, according to cotton experts of the U. S. Department of Agriculture. Both strength and length of fiber have been increased through breeding improvements, and cotton is more uniform and dependable, they add. Primitive cottons brought in from Guatemala and Mexico form the nucleus of new breeding stock which will lead to even greater fiber strength in the next five to ten years.

* * *

Advise your marketing organization about the cleaning program being followed. Clean eggs correctly or please don't wash them at all. Use an approved detergent-sanitizer made for egg cleaning. Clean eggs as soon as practical and possible after production. Change water and use detergent-sanitizer according to directions. Be sure that water temperature is maintained between 110 degrees and 130 degrees Fahrenheit. Immerse eggs no longer than three minutes. Follow a complete sanitary program in handling and marketing eggs, including equipment used for cleaning."

SOME PROS AND CONS ON USE OF . . .

Anhydrous Ammonia Fertilizer

Condensed from Better Rural Life

John B. Smith

AN INNOVATION in nitrogen fertilization started around 25 years ago in the form of a small cylinder of anhydrous ammonia attached to a plow behind a mule in the Delta region of Mississippi. J. O. Smith is given credit for originating the idea. From that modest start the practice of applying anhydrous ammonia directly to the soil has spread through most of the states in the south and west and is moving into the large agricultural states of the midwest.

Anhydrous ammonia is similar to ordinary household ammonia except that it is much more concentrated. Household ammonia is dissolved in water, but anhydrous ammonia is nearly pure ammonia gas compressed to a liquid and held in pressure tanks. There are two ways by which it can be applied to soils. Where irrigation is practiced, the ammonia can be released into the water and spread over the area without too much evaporation loss. More commonly, a pressure tank containing the ammonia is attached to a cultivator and the liquid is carried downward through small metal tubes attached to the cultivator sweeps so that it runs into the loosened soil at depths of four to six inches. It is not applied at the surface because of too great evaporation losses from bare soils. It cannot be used for top-dressing growing crops because of damage to the plants, but it can be used as side dressings where it can be placed below the surface.

Advantages

There are advantages and disadvantages in the practice. A very large portion of the nitrogen used in fertilizers is made by changing the inert nitrogen gas of the air to ammonia. It is changed to solid forms such as ammonium nitrate, urea, sulfate of ammonia or sodium nitrate, but this costs money and dilutes the product. Large quantities of ammonia are

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combined with superphosphate when mixed fertilizers are made, but this is limited by the amounts of superphosphate that are used.

While some commercial urea products have as much as 44 per cent nitrogen and ammonium nitrate has 33 per cent, anhydrous ammonia has around 82 per cent. No conceivable nitrogen compound can be made more concentrated than this, and no conversion cost of the primary product of manufacture is necessary. Therefore, the cost of a pound of nitrogen in anhydrous ammonia is around two-thirds that of the next cheapest source, ammonium nitrate. It has been compared with the various solid carriers of nitrogen for many crops and has been shown to be satisfactory under most conditions.

Disadvantages

The greatest disadvantage is that much of the saving in cost of the nitrogen is lost in the expense of special equipment necessary for shipping, storage and application to the soil. This cost decreases with increases in the quantities used and the practice has shown an over-all profit. Anyhydrous ammonia cannot be used directly on grass crops or on the foliage of other crops, except as this may be possible if sufficiently diluted with irrigation water. It must not be in contact with germinating seed. It can be used on stony soils, but not as easily as where there are no stones.

This story is not intended to advocate that farmers rush immediately to purchase anhydrous ammonia and the equipment for its use. Experience will show its suitability, but it is time to learn about the idea, and to consider if it has a place, especially in stone free soils. This brief discussion is based on an excellent report of the topic by Dr. W. B. Andrews and others in Bulletin 482 of the Mississippi Agricultural Experiment Station.

Spring Wheat Acreage Larger

United States spring wheat acreage is expected to be 21.6 million acres as compared with 21.5 million last year. Northwest spring wheat acreage is expected to be up sharply, however, due to poor planting conditions last fall.

United States spring wheat production will be approximately 310 million bushels if farmers fulfill their planting intentions and yields equal the 1947-'51 average. The present estimate of the winter wheat crop is 611 million bushels. This would give a total wheat crop of around 921 million bushels — approximately 70 per cent of last year's very large crop. *Washington Extension Service*

Grassland Fed Steers Get a Break

. . . new Federal Beef Grades give grass-fat steers a fair classification and encourage the tendency to more grass and roughage in beef production

Condensed from The Rural New-Yorker

R. W. Duck

PRIDE of possession sometimes causes us to grade out fat steers higher than they may attain at the markets. For fattened steers this high home appraisal may be encouraged by the fact that a choice to fancy grade of feeder steers was purchased, and the inexperienced feeder may assume that the animals will finish with a correspondingly high grade when sold as fat cattle.

If the steers were properly fed, carefully handled as they should have been throughout their fattening period, then such a supposition is usually correct. On the other hand, if the steers were not correctly brought along, it is probable that they will fall into a lower classification when they are sold on the slaughter market.

The basic considerations for a market classification of feeder cattle are conformation, quality and type. True, fleshing condition has some influence, but it is secondary in importance for the buyer. Consequently, an experienced and skillful cattle feeder, one with an eye for good doing cattle, may sometimes make an especially advantageous purchase of feeder steers. These animals may be thin but of desirable conformation — broad and deep in the middle; consequently their thin fleshing condition could cause them to be classified a grade or two lower than their actual feeding potential. Such feeder steers might grade as only medium to good, yet respond so favorably to proper feeding that they would finish as choice to prime fat cattle.

This situation is especially applicable to conditions as they prevailed during last year's grazing season, when a severe drought extended over most of the southwest. As a result, large numbers of range bred feeder cattle were forced on the markets considerably earlier than normal. These cattle arrived in comparatively large numbers and within a short-

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New York City

er period of time than the usual fall marketings. It was fire sale for the rancher and bargain day for the cattle feeder; and due to short range, many of the cattle were of intrinsic higher quality than was indicated by their fleshing condition.

Effective December 30, 1950, the Production and Marketing Administration of the United States Department of Agriculture established changes which affect both the names of slaughter grades and the kind of cattle included in each grade. The new classifications for steers, heifers and cows are:

Prime, a combination of the past prime and choice grades. This grade will include only the finest finished cattle that come to market. Animals of this grade are usually young in age, and comparatively few in number.

Choice, animals formerly designated as being of good grade. They are well finished but not so fat as prime grade. The greater number of fat cattle sold on the slaughter markets classify in this grade.

Good, animals formerly graded as medium. It consists mostly of young cattle which were included in the top half of the old medium grade.

Commercial (a new designation), the remainder of the cattle formerly classified in the medium grade. These cattle do not have enough finish to cause them to be classified as good.

Utility (another new designation for slaughter cattle), principally old, wornout cows, as well as some younger cattle of poor quality that formerly were graded as common. The old grade of common has been discontinued.

No change has been made in the grade of cutter and canner. Cattle of this sort produce a kind of beef which is used mostly for processing. In the cutter grade, the loins and top round or other suitable cuts may be removed for the fresh meat trade before processing the rest of the carcass.

Bulls and stags (steers altered late in life) are now classified as either good, commercial or utility; formerly, the latter two were designated as medium and common, respectively.

These changes in slaughter beef grades bring them into conformity with the federal grading system for carcass beef. While no official grading of live animals is done by the USDA, the slaughter grades mentioned are widely used on all of the larger livestock markets in the United States. On the other hand, carcass grades are supervised by trained USDA employees, and constitute the grades under which beef is sold wholesale.

It is, then, up to the slaughter buyer to purchase his cattle so that they will be graded by the

federal meat inspectors at least as high as they were purchased liveweight. This kind of buying takes skill and experience. It requires being fair to the cattle breeder and farmer who has consigned his animals to the stockyards, as well as avoiding loss in the slaughtering process. If the seller is not treated justly he naturally will not ship any more cattle to the commission firm handling his animals. Packers employ trained buyers at all of the stockyards and they deal directly with the livestock commission salesmen in charge of each group of cattle.

The difference between the selling grade and price obtained for cattle at the stockyards and their owner's appraisal in the home feed lot sometimes creates dissatisfaction on the part of the cattle feeder. It is best for the farmer or steer feeder to accompany his shipment all the way through, and to be present when his steers are sold. He can then compare their degree of finish, quality, general appearance and type with that of other cattle in the yards and see how the price offered him checks with that for the other animals.

The new system of grading is in reality up-grading and it means that cattle now being graded as good are actually only of former medium grade. It has the disadvantage that a shipper may have in mind that cattle formerly graded as good sold near the top of the market, and today such a grade might and probably will sell proportionately lower in accordance with its actual lower degree of finish. The up-grading also works somewhat to the disadvantage of the consumer, for more meat is now graded in the upper brackets and at a correspondingly higher retail sales price.

Considerations favorable to the grade changes for the producer are that the present tendency to use more grass and roughage in the production of beef is encouraged and yet the cattle still classify well. For the consumer this means less fat and more lean meat. Since most families do not like excessive fat on their beef cuts, a medium to good finish is therefore the general consumer preference. An increasing number of young cattle are now being fattened on grass, so that they produce this type of leaner beef. The former grade structure did not give them a fair place in cattle classifications, as these grass fat young steers were classified as medium, whereas they now, even just off grass but carrying considerable finish, are sold as of good grade. This is, of course, favorable to the grassland farmer as well as the cattle rancher with plenty of good grass. In actual practice it is resulting in a greater national production of palatable beef. The increasing use of the

new meat tenderizing agents is likewise favorable for the production and use of good grass beef.

With greatly increased numbers of beef cattle in the United States, it is inevitable that price declines for all kinds and classes will continue for the next two or three years. This means that the day is past when the northeastern steer feeder can make a substantial profit by buying feeder steers in the fall and then fattening them to a choice finish, largely on purchased grain.

Tests for the past few years at the New York station, as well as at other stations, have shown conclusively that the most profit from fattening steers in the northeast is from maximum use of good pasture and roughage. Some recent tests at the Ohio station show that when feeder steers were purchased in the fall and then wintered on good hay, they could be fattened the following season to an acceptable market finish on pasture with as little as seven bushels of corn and cob meal per animal.

In this Ohio test, after the steers' arrival in the early fall, they were put on bluegrass pasture where they averaged making a daily gain of three-fourths pound per head for a period of 40 days. They were then placed in an open shed for the winter and fed liberally on good quality legume hay; on this feed they averaged daily gains of one-half pound per head. The following spring, on good pasture, the steers made an average daily gain per head of one and three-quarters pounds for 44 days. They were finished on summer pasture supplemented with corn and cob meal, as mentioned; during this 30 day period they made an average daily gain per head of slightly over two pounds. The total gains made resulted in a good grade of beef with very little grain being fed.

More beef cattle are now grazing in southern pastures than ever before. The introduction of suitable legumes and a long pasture season have combined to make the south an ideal place to raise good beef at low cost. Tennessee, Virginia, Arkansas and Alabama have all made notable and significant increases in beef production during the past few years.

Grain fed cattle cannot successfully compete with grass fat cattle unless they sell at a substantial premium price. Under the present market grading system and consumer demand for a medium fat animal, this means that more cattle feeders will have to use increasing amounts of good quality roughage for winter feeding, combined with improved pasturage for finishing the cattle for market during the following spring and summer grazing seasons.

DID YOU KNOW . . .

There's a Law Which Protects Farmers Against Sharp Practices in Produce Deals

Condensed from Extension Service Review

Dan Alfieri

WHEN a huckster's check bounced back marked "insufficient funds," Albert Umbach of Huntington, Long Island, tried the limited methods he knew in an unsuccessful attempt to locate the culprit. However, the amount of $115.50 — representing the value of a quantity of cabbage— hardly warranted hiring expensive legal help. He reconciled himself to the fact that he'd been "taken" by a fast operator.

Finally, more as a warning to his fellow farmers than with any real hope of getting his money, the Long Island grower wrote of his experience to the *Rural New Yorker* magazine. He set off a chain reaction which brought help from the United States Department of Agriculture, action under a 22 year old law known as the Perishable Agricultural Commodities Act, and ended in restitution of $110 of the debt.

Like many farmers, Mr. Umbach didn't realize that the Perishable Agricultural Commodities Act — called PACA for short — offers day to day help and protection to growers and the produce industry. Dealers, commission merchants and brokers are well acquainted with—and respect—the provisions of the act aimed at protecting them from unfair and fraudulent practices in the interstate buying, selling and consigning of fresh and frozen fruits and vegetables.

And, of course, Mr. Umbach didn't know that he could have employed this important aid to orderly marketing more quickly and simply by a telephone call or letter to the Regulatory Division of the Production and Marketing Administration's Fruit and Vegeable Branch in Washington or one of its field offices.

In fact, it was only by accident last October that the sharp eyes of a USDA employee in the New York city office saw Mr. Umbach's letter in the farm publication and brought it to the attention of the field office of the

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Washington, D. C.

regulatory division. But despite this roundabout method of bringing a complaint, Mr. Umbach recovered all but $5 of the bad check even though PACA investigator Paul Koenigsberg of the New York office had to pick up a cold trail that led to Philadelphia and involved another dealer in addition to the original huckster.

Farmers, like all small businessmen and individuals, dread being enmeshed in extensive and involved legal proceedings in the solution of their difficulties. Significantly, about 90 per cent of all complaints filed under the act have been settled informally, without any of the trappings usually associated with resolving differences of opinion.

T. C. Curry, chief of the regulatory division in Washington, emphasized that the policy in the administration of PACA is to cooperate rather than regulate. Somewhat akin to the "cracker barrel" idea of sitting down, getting the facts straight, and talking things over, informal settlements have been successful in some 48,200 of the 52,800 cases filed since 1930. These emicable settlements have resulted in payments totaling $12,500,000 in those 22 years.

But when individuals refuse to or cannot agree, the PACA has teeth which can bite painfully when the occasion demands. Formal orders issued by the secretary of agriculture have resulted in awards totaling $2,350,000. Refusal to pay reparations awarded in formal orders can mean suspension of the PACA license. And since the law requires all dealers, commission merchants, and brokers handling fresh or frozen fruits and vegetables in interstate or foreign commerce to be licensed, loss of that license is tantamount to being put out of business.

Individual farmers, of course, are not licensed under the Perishable Agricultural Commodities Act, unless they sell produce for others. Yet the protection of the act, and the facilities of the regulatory division, extend to unlicensed growers and shippers, or to anyone financially interested in a transaction covered by the law.

Since the results of amicable settlements are not published, whereas results of formal complaints are, many people are not fully aware of the protection afforded them under the act. Consequently they fail to advance complaints where small sums of money and issues are at stake. And in cases where distance is a factor, recovery of just claims simply never takes place.

To growers, dealers and shippers who know that PACA protects their interests, assistance is as near to them as the telephone. Complaints may be made by phone, telegram, mail or in per-

son. Telephone complaints must be confirmed in writing. They are received by the Regulatory Division of the Fruit and Vegetable Branch, Production and Marketing Administration of the United States Department of Agriculture in Washington, New York, Chicago, Fort Worth, Winter Haven and Los Angeles.

Without charge the division promptly communicates with the other party and investigates the matter. Equal opportunity is afforded each party to present his side. Loss or damage to be paid is also determined, and an amicable informal adjustment is endeavored; however, formal action may be taken if necessary.

Statistics show that about 40 per cent of the complaints filed allege failure to account and pay promptly. About the same percentage allege a rejection, or failure to deliver, without reasonable cause. The remaining 20 per cent are based on allegations of misbranding, false and misleading statements, alteration of federal inspection certificates and disciplinary complaints.

Here are some things to remember about the Perishable Agricultural Commodities Act, which serves growers and the produce industry:

1. A grower doesn't need a PACA license in his own operations . . . but if he sells his neighbor's produce on a commission basis across state lines, he must obtain a dealer's license. This also applies if he buys the produce and resells or consigns it.

2. PACA licenses cost $15, renewable annually, and may be obtained from the PMA Fruit and Vegetable Branch, USDA, Washington 25, D. C., or one of the PACA field offices.

3. The penalty for wilfully carrying on unlicensed interstate or foreign trading in fresh or frozen fruits and vegetables as a dealer, commission merchant or broker can be as much as $500 for each offense, and as much as $25 for each day that operations continue without a license.

4. Produce grown and sold in a state isn't necessarily INTRA-State commerce . . . if it is transported through another state to the market, it becomes INTER-State commerce and is covered by the act.

5. Complaints may be filed by letter, giving complete details of the questioned transaction.

6. Disputed produce dealings may also be submitted for arbitration under PACA.

7. There is no charge whatsoever for investigations and other services performed by USDA employees under the act.

Are the Minor Elements Minor?

Condensed from California Farmer

CONSIDERING the fact that all our energy springs from the soil you would think that man would devote all his scientific energies to first solving the mysteries of the tissue thin top soil layer on this globe.

But actually we know very little about our life giving soil, especially the minor elements. Here and there around the state of California we are turning up evidences of minor element deficiencies.

For example, in Alameda county Lee Benson, the farm adviser, found quite a few apricot trees with yellow, quite small leaves, some striped in appearance with the area between the veins a lighter green and the fruit smaller and later by several weeks, also bearing less sugar.

They found out it was a manganese deficiency and corrected it by applying two pounds of 80 per cent $MnSO_4$ per 100 gallons of water when the leaves of the trees were about the size of 50 cent pieces.

The little trade magazine "American Cyanagrams" asks the question, "How 'minor' are minor elements?" In their discussion of this subject they bring out some interesting facts about minor elements.

One point about minor elements that it is well to remember is that you can very easily suffer for want of certain minor elements on perfectly good rich soil if you have a condition of high acid or high alkalinity. In other words, it is often a question of availability.

In their own words, "Highly acid or alkaline soils make some elements insoluble and unavailable to crops and others soluble in excess and toxic. For example, high alkalinity causes iron, zinc, manganese, copper and boron to go out of solution. In some highly limed vegetable growing areas, manganese has become so unavailable (in spite of the large amounts present in soil) that farmers regularly apply 50 pounds of manganese sulphate per acre as standard practice.

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Los Angeles, California

ELEMENT	CROP	DEFICIENCY SYMPTOM	GENERAL FUNCTION IN PLANT LIFE
Boron	Alfalfa Apples Beets Celery Sugar beets Required for growth of: Citrus, cauliflower, tobacco	"Rosette & Chlorosis" "Corking" "Canker" "Cracked stem" "Crown rot"	Not known specifically—needed for plant metabolism
Cobalt	Forage	Animal malnutrition	Picked up but apparently not needed for plant growth. Required by animals so forage must contain it.
Copper	Citrus Onion Potato Required for growth of: Forage Tobacco	"Dieback" "Yellow tip" Copper reduces scab	Chlorophyl formation Enzyme production Seed production
Iron	Citrus Flowers, Vegetables Fruit (deciduous) Required for growth of: practically all plants	"Chlorosis" "Chlorosis" "Littleleaf"	Chlorophyl formation
Nickel	Citrus	Excess nickel is toxic to citrus—8 parts or more per million	
Manganese	Cotton Cotton Oats Peas Sugar Beets Required for proper growth of: Citrus, forage Tobacco Soybean	"Mottleleaf" "Crinkleleaf" "Grey Speck" "Marsh Spot" "Speckled Yellows"	Carbohydrate metabolism Enzyme action Nitrogen and carbon utilization. Seed production
Molybdenum	Cauliflower Alfalfa	"Whiptail" Causes mottling, necrosis and loss of fruiting in other crops	Required for the reduction of nitrates in plant tissue—increases N fixation
Zinc	Cotton Citrus Corn Pecan Tung Required for proper growth Pastures Tobacco	"Mottleleaf" "Frenching" "Whitebud" "Rosette" "Bronzing" of foliage	Seed production Chlorophyl formation

"On the other hand, alkalinity increases the availability of molybdenum, sometimes causing concentrations in forage plants which are toxic to cattle. Where one element is present in excess a deficiency of another element is sometimes induced. Excess manganese on Hawaiian soils causes iron deficiency in plants, even though an average amount of iron is present in the soil. The condition is corrected by foliage sprays."

The chemical analysis of soils is not always an indication of need, due to this business of availability. The best index of need that we have at present is the appearance of the plant. The preceding table gives some of the elements and our rather limited knowledge of deficiency symptoms.

Clean Up Barn for Fly Control

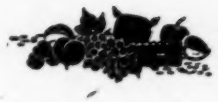
Clean up around the barn and you'll have better luck with fly control. No insecticide can keep flies under control when the insects have a good place to breed, according to recent research by R. J. Dicke and R. H. Jones, entomologists at the University of Wisconsin.

They made fly control tests on Wisconsin farms last summer. Some of these farms were kept clean; others had possible breeding places for flies. The results show that the manure pack of young stock pens and bullpens was generally the main breeding place for flies. If a farmer cleans these pens every week during the summer, fly sprays can do their job. Otherwise, no insecticide can control the flies.

Methoxychlor and lindane were used as barn sprays on several farms. The scientists were able to get good fly control on eight of the farms. The sanitation practices followed on these farms prevented excessive fly breeding. Fly control was a failure on 10 of the farms, and the failure was due to poor sanitation in every case.

On one farm, the hog lot served as a fly breeding place. On several others, there was evidence of flies breeding in silage. One farm in the tests had a loose housing barn with a manure pack. The scientists expected large numbers of flies on this farm, but flies were excessive only in August. As a rule, cows were kept off the pack and it stayed fairly dry.

Results on one of the farms shows the importance of weekly cleaning in calf and bull pens. The sanitation was usually excellent on this farm, but cleaning was neglected for awhile in late July. Fly populations built up fast until the farmer cleaned the barn thoroughly again. That corrected the situation, and fly control was good for the rest of the season. *University of Wisconsin*



Research May Cut Fresh Fruit Loss

A SERIES of volatile chemicals may hold the answer to one of agriculture's top problems — the molds and rots which destroy about one-fifth of all fresh fruits and vegetables after harvest.

Two years of research with the chemicals on fresh produce were reported recently by Purdue agricultural scientists.

The researchers, working under a grant from A & P Food Stores, were able in laboratory and field tests with the chemicals to reduce peach losses up to 75 per cent and strawberry losses by 50 to 75 per cent.

Strawberries and peaches are two of the most perishable commodities in fresh fruits and vegetables where an estimated 75 million dollars yearly is lost through spoilage after harvest.

The research team emphasized its work still was in a preliminary stage and that the methods were not ready for general use. However, the chemicals, which are inexpensive and easy to apply, show considerable commercial promise, they said.

Dr. Eric G. Sharvelle of the department of botany and plant pathology reported that two of the chemical compounds he used —trichloroethylene and tetrachloroethylene — "offer considerable promise as space fumigants for the reduction of post-harvest deterioration of fresh strawberries." He found that tetrachloroethylene showed similar promise for reducing brown rot losses in commercial peaches.

In one of his laboratory experiments, he inoculated peaches with brown rot fungus and then treated the fruit with vapors of tetrachlorethylene for 12 hours with a concentration of one part chemical to 20,000 parts of air. He said this concentration was most effective in reducing losses without fruit damage or undesirable off-flavors. Losses could be held to a low level (75 per cent reduction) for 72 hours at room temperature.

In another experiment during which peaches were inoculated, treated and stored for nine days in cold storage, they were set out at room temperature of 80 degrees after storage. In 24 hours, 58 per cent of the fruit which had not been treated with the chemicals was spoiled as compared with six per cent of the treated fruit.

Reprinted from Indiana Farmer's Guide

After 48 hours, 91 per cent of the untreated fruit was destroyed against 30 per cent of the treated peaches.

Dr. Sharvelle also reported on a small scale experimental truck shipment of strawberries. Several cases of fruit were treated in transit in sealed containers. The use of tetrachloroethylene in this experiment, he said, "significantly reduced market losses for 48 hours at room temperature after arrival."

New Cattle Grub Control Uses Injection Method

A new method of controlling cattle grubs may someday mean a substantial cut in the 100 million dollar loss farmers and ranchers suffer each year from damage to meat and hides. T. R. Robb, Wyoming entomologist, says killing cattle grubs by injecting cattle with insecticides is under investigation.

Practical use of chemical injections to control grubs now amounts to no more than a future possibility. But here's what specialists have found so far. During the past year, they tried injecting yearling cattle with each of three chemicals—aldrin, dieldrin and lindane. Four injections of any of one of these chemicals gave first rate control. Workers started injections when grubs began to show up as bumps under the skin in the backs of cattle and repeated the treatment every 28 days.

Investigators say the bloodstream of the cattle carried the insecticides—as systemic chemicals—to all parts of the animals' bodies. When grubs reached the backs of the cattle, the pests began to feed heavily on the tissues and automatically dosed themselves with insecticide. *University of Wyoming*

United States agricultural exports dropped 15 per cent on a dollar-value basis in the calendar year of 1952. The decline was from the postwar record year of 1951 when the value of such exports rose to $4,040,054,000. The 1952 total valuation was $3,424,738,000.

Nearly nine out of 10 farms in the United States now have electric service. Less than 20 years ago, only one farm in 10 had such service.

It is far easier to preserve the organic matter content of the soil than to build it. By adding two tons of raw organic matter each year, farmers could increase the content of their soil only two per cent in 100 years.

BAND SEED for Better Legume Stands

Fix your drill to put legume seed over the fertilizer. You get a better stand, use less seed.

Condensed from The Michigan Farmer

M. B. Tesar

BAND seeding is a new method of seeding legumes which gives all the seedlings a "shot in the arm" from fertilizer. It gives stronger plants and should result in a saving of up to 20 per cent in seed costs to farmers who will modify their present drills into "band seeders."

Over two million acres of land in Michigan alone are seeded each year to legumes like alfalfa, red, sweet, alsike and ladino clovers for hay, pasture and green manure use. It is hard to estimate how many of these seeded acres fail because of drought, poor fertilization, poor seeding methods, or other reasons. It is probable that at least one acre out of 10 seeded acres is a failure. These failures result in a waste of land preparation, fertilizer and seed.

Some of the causes of seeding failure, like drought, are uncontrollable but since the method of seeding is controllable, the best seeding methods available should be used to improve seedings. Band seeding seems at present to be the best method of seeding. It gives stronger stands and saves seed with only a small expenditure for fixing up a regular grain drill.

Band seeding is simply the planting of all the legume seed

Reprinted by permission from The Michigan Farmer
Detroit, Michigan

on top of the ground in a narrow band above the fertilizer. You fertilize to help the legumes so why not put the legume seed above the fertilizer? Legume seedlings are slow to start and need the phosphorous from applied fertilizer for quick root and top growth. This helps them become well established before summer droughty conditions start.

Just how soon do legumes get the benefit of fertilizer drilled one and a half inches deep when the seed is sown on top the ground? Tests with radioactive phosphorous in the new plant science greenhouse at Michigan State college showed that alfalfa directly over fertilizer was getting fertilizer benefits two weeks after seeding; it got all its phosphorous from the fertilizer during the first month. Plants an inch away from fertilizer did almost as well in getting fertilizer, but those two inches away got only one-tenth of their phosphorous from the fertilizer. Seedlings three inches from the fertilizer got practically no fertilizer benefit the first month. By the end of the second month, only 25 per cent of their phosphorous came from the fertilizer whereas those only one or two inches away were getting from 50 to 75 per cent of their phosphorous from the fertilizer. This experiment showed that if alfalfa seedlings (and it is expected other legumes would act similarly) are to get maximum benefit from fertilizer drilled one and a half inches deep, the seed should be placed above the fertilizer. A band of seed which is no more than an inch to the left or right of the fertilizer band insures correct placement of the seed.

Tests conducted in the field by the farm crops department at Michigan State college in 1950, 1951 and 1952 showed that band seeding resulted in 25 per cent more plants per acre than when conventional broadcast seeding was used. Plots seeded with oats in the spring were fertilized with 200 to 400 pounds of 0-20-20 with a drill set one and a half inches deep. The seed was placed on top of the ground behind the drill in both seeding methods—in broadcast seeding it was scattered behind the drill but in band seeding it was placed over the fertilizer rows. A third seeding method — drilling the seed one and one half inches deep with the fertilizer — gave stands only one-sixth as good as when band seeding was used.

Results given above are from nine different trials during the three year period. Band seeding gave greater numbers of plants per acre than the broadcast seeding in all nine trials, increases ranging from 7 to 61 per cent.

The 25 per cent average increase in seedlings resulting from band seeding means that, on the

average, farmers could expect to get five plants from a given amount of seed where they now get four. Because banding seems to be a more efficient method than broadcasting, farmers should be able to reduce their seeding rates by one-fifth. In other words, if you now broadcast eight pounds of alfalfa per acre, you should be able to reduce the rate of seeding to 6.4 pounds, a saving of 1.6 pounds of seed (about 75 cents for alfalfa) per acre.

In addition to saving on seed costs, band seeding results in more vigorous, stronger plants, since all the plants get the benefit of the fertilizer in a hurry. In broadcast seeding, the plants close to the fertilizer are vigorous but those between the fertilizer rows are often smaller and not as thrifty. They are most likely to be injured by summer drought especially on lighter soils. Farmers often remark that they notice how much stronger plants over the fertilizer rows are as compared to those between the rows.

Whenever any seeding method was used in the nine trials, the area was cultipacked after seeding in the same direction as the drilling. Cultipacking crosswise to the direction of drilling is not advised since it might cover the legume seed too deeply and result in poor emergence. Cultipacking is advisable on lighter soils but may not be necessary on heavier soils —in fact, it may be undesirable if the soil would crust after cultipacking.

It is believed that in the future, implement companies may have attachments which will convert their regular grain drills into band seeders. The simplicity of such an attachment should keep the cost down to an estimated $20 to $30 for a 13 to 17-hole drill.

Since attachments for adapting drills to band seeding are not commercially available, farmers who want to use this better seeding method will have to fix up their drills in their workshop. The job is really a simple one which should not take over a day. Estimated costs by farmers who have adapted their drills to band seeders range from $1 to $20 per drill, depending on materials used.

Here are the important principles to remember in converting your drill into a band seeder and making a seeding:

1. Legume seed to be placed in a narrow band (2 inches or less in width) over fertilizer.

2. Legume seed must fall on top of ground about 15 inches behind drill so it is not covered by soil.

3. Cultipack after seeding (unless soil is heavy) to get shallow seed coverage. Cultipacker can be drawn behind the drill to save one operation.

Regardless of what make of drill you own, you can convert it

into a band seeder. Any seed tube extension which places all the seed on top of the ground above the fertilizer about 15 inches behind the fertilizer tube is satisfactory. The seed should fall 15 inches behind the discs so that soil thrown by the discs will not cover the seed. The end of the tube extension should be two to three inches above the soil surface when the drill is set at a depth of one and one-half inches. The seed is scattered too much if the end of the tube is six inches or more above the soil.

A. J. Cable in Clinton County has attached old pieces of flexible garden hose to the drill shoe. If the end of the garden hose hits a rock, it will give without causing damage. When seed tube extenders are made of garden hose special care must be taken to have a gradual downward slant to these tubes so that the seed will pass through the tubes without clogging. The end of the seed tube can be cut at an angle so that one can see from the rear if the seed is falling from each tube.

The drill used by the farm crops department has a 15 inch length of three-fourths inch pipe attached with a 15 inch strap iron (one-eighth by one inch) to the cast drill shoe. An 18 inch spiral steel tube one-half inch in diameter (cost 50 cents each) such as used on a McCormick-Deering drill is attached with a cotter key to the six inch steel spiral tube leading from the seed box. As the drill is raised or lowered or hits a rock, the one-half inch tube slides up and down in the three-fourths inch metal tube —just like the fertilizer tube slides in the drill shoe of the drill.

Chains serve to cover the seed but they should be REMOVED since they scatter the seed too much and defeat the principle of band seeding. Cultipacking will give better shallow seed coverage than chains.

Paul Rickerd, from Grand Traverse County, added pieces of milker hose to ends of grass seeder spouts making them about 10 inches longer. He thinks he gets about one-third better stands with band seeding.

Harold Outman, from St. Joseph County, has used band seeding two years and thinks he gets 50 per cent better stands and that the plants grow much faster. Harold attached garden hose to the seeder spouts on his drill and ran them through steel tubes back of the drill shoe. The tubes are made by the implement company as a special attachment for fertilizer.

Remember that when you fertilize with 0-20-20, 0-12-12 or other fertilizers you are fertilizing to help the legume. Get the most out of this fertilizer by putting the legume seed over it by band seeding.

Americans can learn from
Scandinavian Countries . . .

How Livestock Diseases Can Be Controlled

Condensed from Nebraska Farmer

Ralph S. Yohe

DURING the last five months, I have visited all the countries of Scandinavia. I talked to farmers, vets, and livestock disease control officials in Norway, Finland, Sweden and Denmark. Here is what I found:

"We don't have much trouble with contagious diseases here," a young Norwegian veterinarian told me. "In the part of the valley I serve we have about 5,000 dairy cows and a much lesser number of hogs and horses. Horses are fast giving over to tractors.

"With the exception of vibrionic infection and mastitis in dairy cows, we have few contagious diseases in Norway."

Later, disease control officials told me there had been no cases of brucellosis in Norway during the last year and that within a short time even the last vestige of tuberculosis in cattle would be wiped out.

These countries have either eradicated or kept out of their country a whole parade of contagious diseases that run rampant through the livestock herds and flocks in our own country. . . . diseases like hog cholera, trichinosis, rhinitis and vesicular exanthema in swine, newcastle disease and fowl cholera in poultry, rabies in dogs, while diseases like brucellosis, tuberculosis and anthrax have been brought under strict control.

How do they manage it? Let's look at their disease control programs.

Just as in our own country, they have an effective tuberculosis program to eradicate the disease from their cattle. Today the incidence of the disease is at a very low level. Finland and Norway have gone a step further. They have control programs for avian type tuberculosis that infects both chickens and hogs.

Last year there were only 25

Reprinted by permission from Nebraska Farmer
Lincoln, Nebraska

herds found to have reactors among Finland's more than one and a half million cattle.

Thirty years ago 80 per cent of the Danish dairy herds had tuberculosis. Today, for all practical purposes, tuberculosis doesn't exist in Denmark. It is about the same story in the two other Scandinavian countries, Norway and Finland. In order to erase the last vestige of the disease, if reactors are found, the entire herd is generally slaughtered and control measures taken with the same precision that we used in America to eliminate foot-and-mouth disease.

Today American livestock men and health officials are becoming more and more concerned with the eradication of brucellosis. The Scandinavian countries several years ago rolled up their sleeves and went to work to get rid of brucellosis, not just half-heartedly control its spread.

At the head of the list stands Norway. In 1935 there were 3,000 infected herds in Norway. Last year they did not have a single reactor. Five years ago Finland had 4,000 herds infected with brucellosis. Last year less than 100 herds had reactors. In 1938 Sweden started an intensive campaign to get rid of the disease. Around 50 to 70 per cent of the larger herds in the country were infected.

Today Sweden has around 370,000 dairy herds. Only 1,200 of them have brucellosis reactors. This figures out to be a little less than 0.4 per cent, or one herd out of every 250.

Getting Rid of Brucellosis

There are no secrets in the methods these countries are using to get rid of brucellosis. With the exception of the ring test for milk, they use the same weapons that we have known about for years. True, they are not faced with the problem of beef cattle. They have only dairy cattle. But their success still depends on the strong determination to get rid of the disease once and for all.

Since 1948 Finland has slaughtered all brucellosis reactors. In acute cases, abortion storms, the entire herd may be destroyed. They have used no vaccination since 1946. It is compulsory for farmers to test their herds when an abortion occurs on the farm. Ring tests on milk are run at all the dairy plants. In case of ring test reaction, the animals in the herd are given blood tests. Norway has about the same regulations. They do not vaccinate either.

Sweden requires slaughter of reactors only in clean areas. But cattle cannot move from infected areas to clean areas. Infected cows must not be sold except for slaughter or into infected herds. Ring tests are made on all milk coming into the dairy plants to

spot infected herds. This is followed by blood tests of the individual animals in the herd if reaction is found on the ring test. Strain 19 vaccine can be used on permission, but actually very little vaccine is used in Sweden.

Denmark, too, uses the ring test three times a year on all dairy herds. Reactors may be removed all at once or gradually, depending on the number. Once 90 per cent of the herds supplying a dairy are clean, then the other 10 per cent of the farmers must clean up their herds. Vaccination is used, but only on permission from livestock health officials.

Dairies pay less for milk from infected herds. All these countries for many years have required that all skim milk or whey returned to the farm be pasteurized.

Hog Cholera Gone

There is no hog cholera in any of the Scandinavian countries. Outbreaks have occurred. The last in Norway was in 1930. Sweden had a few outbreaks during the war. Both were quickly eradicated by disposing of the animals and quarantining the area.

About a year ago in America we had widely scattered outbreaks of anthrax, particularly throughout the midwest. It was thought to have been brought into the country in imported bonemeal. Left to their own, without national guidance, each state moved independently to stop the spread. But by then much of the damage had been done. And many new farms and new areas were seeded down with anthrax spores capable of living for 20 or 30 years in the soil.

Since Scandinavia must import much of its feedstuffs from other countries, it, too, is in constant danger of introducing anthrax. A few outbreaks occur each year. But with this difference. These countries are prepared to stop the disease in its tracks and prevent the seeding down of anthrax spores in new areas.

Today, we Americans have been greatly concerned with the possibility of foot-and-mouth outbreaks. We are all aware of the effective campaign waged against the disease in Mexico and more recently, during the outbreak in Canada. On previous occasions we, too, have eliminated the disease from our own country.

Southern and central Europe are hotbeds of infection. With infection running high in bordering countries, it is not easy for the north countries of Europe to control foot-and-mouth disease. About every three years the disease builds up in intensity in Europe. And it is then that outbreaks are likely to occur in Scandinavia.

Foot and Mouth Control

The last outbreak in Finland occurred in 1941. It was wiped out by slaughtering infected herds

and stopping the movement of livestock in a zone around the infection — a method similar to that used in America in the past and more recently in Canada. By similar methods, Norway got rid of its last outbreak a little over a year ago.

* * *

Seven years of experimentation by the USDA have shown that chemical weed killers help produce corn at lower cost. Used before corn comes up, after the plants emerge, and at lay-by time, 2,4-D will control weeds, reduce the number of cultivations needed and increase corn yields.

* * *

When the disease starts building up in Germany, Sweden vaccinates the cattle in its southern province of Skaane. When single outbreaks occur, the infected herds are destroyed and an almost military control of livestock movement is slapped on in the area. If the disease becomes widespread, they use a combination of vaccination and slaughter of infected animals, similar to the program used in Mexico.

Denmark, with a common border with Germany and many of its islands only a few miles from the continent, stands in constant danger of the disease by reinfestation. She tries to keep the disease down by controlled vaccination. While vaccination has lessened the severity of the disease, it cannot be said that Denmark has eradicated foot - and - mouth disease.

Under the Scandinavian slaughtering system, each animal is marked so the disease can easily be traced back to the farm from where it came. This is one great weapon that disease control officials in Scandinavia have that our people do not. One of the quickest places to spot a disease outbreak is in the slaughter plant.

* * *

Grain supplies in the four principal exporting countries — the U. S., Canada, Argentina and Australia — on January 1 exceeded those of the same period last year by 16 per cent.

* * *

The Scandinavian extension people, along with the dairy and meat packing plants and farm organizations, have banded themselves together to educate themselves as well as livestock producers of the dangers and control of contagious diseases. Compulsion has been of secondary importance. In Sweden even the local agricultural societies that direct local extension work have their own extension veterinarians.

Scandinavia has indeed done an outstanding job of disease control work. We could well copy their example.

Facts and Figures on the

Best Age to Breed Beef Heifers

Condensed from The Shorthorn World

L. S. Pope

Oklahoma A. & M. College

HIGH costs of feed and labor, and the attractive prices for purebred cattle, have renewed interest in breeding heifers at an earlier age than is normally practiced, thereby lengthening the productive lifetime of the beef cow. In purebred herds, it is common practice to breed heifers at about 18 months of age, while many commercial cattlemen believe it is best to allow the heifer to develop for 24 to 27 months before breeding. Although it has been considered desirable to allow heifers to make most of their growth before being subjected to the demands of gestation and milk production, many cattlemen today are finding it profitable to breed heifers at 15 months old, and the practice seems to be increasing in popularity.

Since this practice places a severe strain on the growing heifer, questions are raised as to its effect on her lifetime productivity as well as to some of the dangers of early calving. The answers to these questions may differ considerably as they apply to purebred and commercial production. Since most purebred replacement heifers receive ample feed from the time they are dropped, and are allowed to develop at maximum rate, the effects of early calving may not be as severe as they would be with commercial heifers "roughed" through the winter. On the other hand, danger of a high death loss among early calving heifers may discourage many purebred breeders from trying it. Then, too, the purebred breeder must keep sale and show dates in mind in planning his breeding program.

The growth and development of the heifer up to the time she is bred has an important bearing on the best time to breed. Many cattlemen maintain that the size and development of the heifer are a much better yardstick than age. Small or late heifers should be given an extra period of growth to avoid serious trouble at calving.

Reprinted by permission from The Shorthorn World
Aurora, Illinois

When heifers are to be bred early —as yearlings, for example—they should be wintered well. Winter gains of one pound a day are desirable. When heifers are roughed through the winter so that they make most of their gain off grass during the summer, they may lack the size and development as two year olds to avoid calving difficulties.

Early Kansas experiments show the detrimental effects of early breeding and low levels of wintering. At five years of age, cows wintered on roughage with no grain and bred to drop their first calves as, two year olds had weaned calves averaging 348 pounds, while cows handled in the same manner, but bred to calve first as three year olds, weaned calves with average weight of 405 pounds. In this experiment, wintering heifers on roughage only and calving them at two years of age reduced the first calf crop by 30 per cent and about one-third of the cows became temporarily sterile.

Later Oregon experiments, however, showed that heifers which calved first as two year olds produced 0.7 more calves during the first six and a half years of their lives than heifers calving first as three year olds. In this experiment, a low level of winter feeding was not as severe on the heifers, although at four years of age, cows that had calved first as two year olds averaged 100 pounds less in body weight than cows of the same age that calved first as three year olds. Likewise, there were a smaller number of calves dropped in the early calving group at three and four years of age.

On the west coast many commercial cattlemen breed replacement heifers as yearlings to calve at approximately two years of age. To reduce the heavy strain of lactation so that the heifer may continue to grow and rebreed, many ranchers veal the first calf at 8 to 10 weeks. In purebred herds, the same thing can be accomplished by placing the calf on a nurse cow. Early calving heifers, relieved of the strain of milk production, will often rebreed quicker than those nursing calves.

Briefly, the disadvantages often resulting from breeding heifers to calve early—as two year olds—are:

1. A heavy death loss among the heifers and their calves is often experienced at calving time. A large percentage of early calving heifers require assistance. In a recent Oklahoma experiment, 28 out of 56 heifers calving at two years of age needed help. In another experiment with 237 heifers in a large commercial herd, an average of 60 per cent of the two year olds had to be assisted at calving and eight heifers and 29

calves were lost. Together with this high death loss, there is always the danger of permanent injury—posterior paralysis, injury to the genital tract—which removes the heifer from further production. Despite this, one commercial cattleman who operates on a large scale recently stated that although he lost as many as 12 to 15 per cent of the calves and three to five per cent of the heifers, it was still more profitable in his opinion to breed heifers as yearlings to calve at two years of age.

A few experiments have been conducted on the influence of the size and breed of bull on the difficulty experienced by young heifers at calving time. The tests conducted so far may not be the final answer, but there is evidence that, within breeds, the size and type of the bull is one of the most important factors contributing to difficulty at calving time. Therefore, in commercial production it is recommended that yearling heifers be bred to a somewhat smaller, more refined type of bull than is used on older heifers and mature cows.

In this regard, it should be obvious that the age of the bull is not a factor as to the birth weight and size of the calves he will sire. A young bull, potentially the sire of big calves, will cause more trouble than an older bull which sires small calves. In selecting the bull to use on young heifers—type, not age, is the more important consideration. However, if the bulls are of the same type, many producers will select a young bull for use on yearling heifers.

2. Lactation places a severe strain on the young, growing heifer. Normal body development is checked, at least temporarily, and some heifers may be permanently stunted unless feed is adequate. Lactation is apparently a much more severe strain on the young heifer than gestation. Tests have shown that the actual amount of nutrients removed from the body of the dam by the fully developed calf at birth is quite small. The newborn calf is nearly two-thirds water and contains no more protein, fat and mineral than 400-500 pounds of milk. Since lactation places the heaviest strain on the young heifers, a good ration with plenty of protein is essential. Underfed heifers nursing calves may become stunted, fail to rebreed, and wean a small, undeveloped calf. As mentioned earlier, it may be desirable to place calves from young purebred heifers on a nurse cow so that the heifers can resume normal growth.

3. Failure to rebreed the following season is often the case when heifers are bred to calve as two year olds. This results in a high percentage of dry three year olds. The demands made on the body for growth, development of

the unborn calf, and lactation take precedence over those for reproduction. Unless feed is plentiful, nature protects the undeveloped heifer in that she fails to conceive the following year. In a recent experiment, out of 44 heifers that calved as two year olds, 10 failed to rebreed the following summer while nursing calves, even though they were fed supplements on grass. Under the same conditions, older cows were observed to rebreed normally.

4. Early calving retards the development of the heifer. Heifers bred to calve at an early age require a longer time to reach mature body size. As will be shown later, in one experiment cows at four years of age that had calved first as two year olds averaged 86 pounds less than cows handled under identical conditions but calving first at three years of age. Eventually, this difference in body weight may be overcome if feeding is ample, but its effect on the lifetime productivity of the beef cow has not been determined.

5. First calves are lighter at weaning from two year old heifers. Generally, this difference under range conditions is about 50 pounds per calf. As a rule, second calves from early calving heifers are no heavier at weaning than the first calves from three year old heifers.

To further study this problem, an experiment was undertaken several years ago at the Fort Reno research station, Oklahoma A. and M. college, to determine the effect of age at first calving and level of winter feeding on the lifetime productivity of grade beef cows. The project was started in 1948 with 15 weaner heifer calves in each of six lots. Lots 1 and 2 were designated the "low level" group and were fed 1.0 pound of cottonseed cake per head daily on dry native grass pasture. Lots 3 and 4, the "medium level" group, were fed two and a half pounds, while Lots 5 and 6, the "high level" group, received two and a half pounds of cake and three pounds of oats per head daily on dry, winter pasture. The heifers grazed the same pasture during the summer. Heifers of the odd numbered lots (1, 3 and 5), were bred as yearlings to drop their first calves in 1950 at two years of age. Heifers of the even numbered lots (2, 4 and 6) were bred as two's to calve at three years of age. The data obtained up to the fall of 1951—first three years of the experiment—are summarized below.

The cows are to be continued on the same winter treatments to determine the accumulative effect of early breeding, combined with low levels of nutrition, on their lifetime performance.

The heifers wintered continuously on the "low level" (lots 1

and 2) lost considerably more body weight during the winter season than those wintered at the medium, or high levels. While they made greater summer gains, the heifers of lot 1 wintered at the low level and bred to calve as two year olds failed to reach the same body weight at three and a half years of age as heifers of lots 3 and 5. On October 26, 1951, after the heifers had been wintered on their respective levels for three years, there was a difference of 86 pounds in the average body weight of the two groups, in favor of heifers bred to calve first as three year olds. Thus, breeding heifers as yearlings to calve as two's tended to delay their body development. This was more pronounced where winter supplements were limited. Among the heifers bred to calve as three's (lots 2, 4 and 6) there was no consistent difference in body weight at three and a half years of age.

One heifer was lost at calving while another was badly injured and sold on the market the following summer. However, at three and a half years of age there was an average of 407 pounds more calf produced by the two year olds, an advantage obtained at no extra feed cost.

On the surface, the data would indicate that the cows wintered on the "low level" were the most profitable group. Total feed costs for these heifers were about one-half as much as for heifers on the "high level" of wintering. However, it should be pointed out that some heifers on the low level lost over 300 pounds of body weight from October to April, with much of this loss occurring in March and April while they were nursing calves. Also, the pasture seasons encountered during the experiment were especially good and ample grass was available. If during these years, spring pastures had been slow to develop due to a drought, substantial death losses might have occurred among the "low level" cows, or a large number might have failed to rebreed. Thus, the extra feed given to cows of the medium and high level lots may have been worth while insurance. The project is to be continued and it is possible that the length of the productive life of the cows wintered on the low level may be shortened, especially those bred to calve as two year olds.

In summer, we might say that heifers handled under practical farm or range conditions may be successfully bred as yearlings (15 to 18 months) to calve at two years of age provided:

1. Winter feeding is ample to meet the increased demands for growth, gestation and milk production. Under commercial conditions, heifers should gain about a pound a day during the winter period. They should weigh about

600 pounds when bred. Purebred heifers should meet, or exceed, these requirements.

2. Young heifers must be watched closely at calving time; about 50 per cent will need assistance.

3. Heifers must be fed well while nursing calves.

4. It is best to breed only the larger, well developed heifers as yearlings, allowing the smaller heifers a chance to grow for another year. Under commercial conditions, at least, a small type bull should be used on yearling heifers.

Smaller Pig Crop Indicated for '53

The pig crop report issued recently by the United States Department of Agriculture points to a continuation of the decline in hog numbers. Farmers' reports on breeding intentions indicate a 1953 spring pig crop of 48 million head—15 per cent smaller than last spring. That estimate is based on an indicated total of 7,395,000 sows to farrow and assumes an average litter of six and a half pigs.

The total 1952 pig crop was 91,800,000 head—10 per cent below the 1951 crop. The spring pig crop was down nine per cent and the fall crop 11 per cent.

The fall crop—at 35,355,000—is the smallest since 1948. The number of sows farrowing the past fall was 12 per cent below 1951, but the number of pigs saved per litter was 6.65—equalling the record high set by the 1950 fall crop.

Marketings from the 1952 spring crop was quite rapid during the fall and at weights slightly higher than the previous fall. That reflects the tendency of recent years toward earlier farrowing and earlier marketing, the U.S.D.A. report explains.

A good creep feed for lambs is a mixture of 20 pounds of cracked corn, 20 pounds of oats, 10 pounds of bran and 10 pounds of soybean meal.

Manure produced by a dairy cow each year contains around $30 worth of nitrogen, phosphorous and potassium.

The silo is the cheapest building in terms of stored feed value that can be built on most dairy farms.

In many cases it's easier to cure mastitis infection in a cow when she's dry than when she is milking.

BEEF CATTLE

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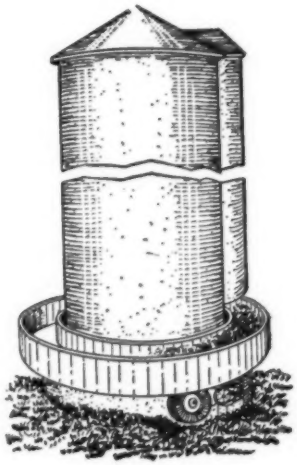
Merry-Go-Round the Silo



WITH more livestock and less hired labor, C. C. Tyner and his son, Carl, of Tipton, Indiana, looked for ways to ease the feeding chore.

They built a concrete track all around one of their silos. On this, they built a circular feed trough and mounted it on small wheels.

For a driving mechanism, they belted a ½ - h.p. motor through a speed reducing unit to a pneumatic-tired truck wheel against which the trough rested. When feeding time comes, they flip a switch. The rubber tire turns, driving the trough around the silo like a merry-go-round. They climb into the silo and throw down silage into the slowly turning trough which is soon filled and 30 head of cattle fed.

Cost was about $350. They liked the first unit so well they built another and now plan to add a mechanical silo unloader to make the job 100 per cent push button.

Condensed from Electricity on the Farm